

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Permitting and Compliance Division

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Permit Fact Sheet

Permittee: Stillwater Mining Company

Permit No.: MT0024716

Receiving Waters: Stillwater River and Alluvial Ground Water

Facility Information

Name: Stillwater Mine
Contact: David Johnson, Environmental Manager

County: Stillwater

Fee Information

Major/Minor: Minor
Type: Private Minor
Number of Outfalls: 3 (for fee determination only)
001 – Mine discharge to Stillwater River
002 – Mine discharge to ground water and Stillwater River
003 – Mine discharge to ground water and Stillwater River

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1 BACKGROUND

This fact sheet identifies the principal facts, and significant factual, legal, methodological, and policy issues considered in preparing a draft permit in accordance with Administrative Rules of Montana (ARM) 17.30.1371. A fact sheet is prepared for any draft permit that established new or amended effluent limitations or standards, schedules of compliance, variances, nonsignificance determinations under ARM 17.30.706, denial or granting of mixing zones under ARM 17.30.515, or other significant requirements.

Stillwater Mining Company (hereinafter Permittee) is the owner and operator of the Stillwater Mine (hereinafter Facility), an underground platinum and palladium mine.

In this permit and fact sheet, references to the “discharger” or “Permittee” in applicable federal and state laws, regulations, policy, plans, or implementation procedures are held to be equivalent to references to the Permittee in the permit and fact sheet.

Montana has adopted a number of federal regulations by reference which are used in this permit as a basis for permit limits. Reference to “director” or “state director” in these federal regulations means the Department (hereinafter DEQ) as defined in ARM 17.30.1322 when these references are to a delegated or approved NPDES state program, otherwise, it refers to the Regional Administrator.

1.1 Permit and Application Information

Currently discharges from the Facility are regulated by Montana Pollutant Discharge Elimination System (MPDES) permit number MT0024716, which became effective on November 1, 2008, and expired on October 31, 2013. The Permittee submitted an application for renewal of the permit dated April 29, 2013. The Montana Department of Environmental Quality (DEQ) reviewed the application and issued a Notice of Deficiency on July 1, 2013. The Permittee submitted a revised application, dated September 17, 2013, and DEQ deemed the application complete on October 10, 2013.

The terms and conditions of the 2008 MPDES permit have been administratively continued and remain in effect until a new permit is effective.

1.2 Description of Facility and Discharges

A Facility or activity is any point source, including land or appurtenances thereto, that are subject to regulation under the MPDES regulations. An outfall is a point source subject to regulation under the MPDES program. The discharge of pollutants to state waters is limited to outfalls authorized in the Facility’s discharge permit.

1.2.1 Description and Location of Facility

The Permittee owns and operates an underground platinum and palladium mine with an associated mill and lined tailings impoundment (Facility). The Facility is located near Nye, Montana, in Stillwater County. Facility operations are located within a 1,168 acre operating area and include various process and maintenance buildings, employee facilities, storage facilities, offices, and water treatment system. The Stillwater River divides the Facility into East and West sides, with an adit on each side. The

Facility uses conventional blasting techniques in production stopes and some development headings. In September 2012 a tunnel boring machine (TBM) was deployed to develop a new area of the Facility. The TBM uses cutting heads without the use of explosives.

The sources of wastewater at the Facility include adit water which is ground water that has infiltrated the underground mine workings, and storm water that infiltrates or runs off. Any process wastewater from the mill is directed to the tailings impoundment and no discharge from the tailings impoundment is authorized by this or any previous MPDES permit.

The Facility also operates the Hertzler Ranch Land Application Disposal (LAD) Facility. The Hertzler Ranch Facility is located approximately 8 miles north of the mine and is regulated separately under MMRA Operating Permit #00118, which is administered by DEQ Environmental Management Bureau (EMB).

1.2.2 Wastewater Treatment or Controls

Wastewater treatment of mine adit water at the Facility consists of clarification and/or a moving bed bioreactor/biological treatment system (MMBR/BTS). Mine adit water is also reused in underground workings for drilling and other mine related purposes. Mine water from inactive mine workings, the East Side Line, is currently discharged to ground water without treatment.

The MMBR/BTS is composed of two moving bed bioreactor (MMBR) cells followed by the biological treatment system (BTS). Mine waters enter the oxygen enriched MMBR cells where ammonia is nitrified to nitrate, followed by denitrification in the BTS where methanol is added to enhance the denitrification process. Once treated in the MMBR/BTS, wastewater is routed to a lined temporary storage pond prior to being routed to either the the Hertzler Ranch LAD or the outfalls described in this MPDES permit.

The following operations or activities contribute to the permitted discharge flow:

Sources of Wastewater Contributing to Each Outfall			
Outfall	Description	Average Flow (gpm)	Intermittent (Y/N)
001	Adit Inflow	1,240 (projected)	N
002	Adit Inflow	278	N
003	Adit Inflow	339	N

1.2.3 Discharge Points

The Permittee discharges from the treatment system described in Section 1.2.2 into state waters at the locations identified in the table below. These locations were identified in the Permittee's MPDES permit application. By definition, state waters are any surface or underground body of water, irrigation system or drainage system. Ponds, lagoons, or other waste impoundments used solely for treating, impounding, or transporting wastes are not state waters. Discharge to state waters is prohibited unless expressly authorized in the Facility's discharge permit. The beneficial use classifications and applicable water quality standards for the receiving water are identified in Section 2.

Discharge Locations				
Outfall	Latitude	Longitude	Receiving Water	Receiving Water Classification
001	45° 23' 05" N	109° 52' 16" W	Stillwater River	B-1
002	45° 23' 38" N	109° 51' 43" W	Shallow ground water adjacent to Stillwater River	Class I B-1
003	45° 23' 12" N	109° 52' 09" W	Shallow ground water adjacent to Stillwater River	Class I B-1

The discharge authorized at Outfall 001 is a direct discharge to the Stillwater River. The Permittee has not constructed or installed a pipeline or other conveyance structure for discharge to the Stillwater River. The estimated average flow for Outfall 001 reported in Application Form 2C, is 1,240 gallons per minute (gpm). Actual flows from the initiation of mining to the present are zero.

The discharge at Outfall 002 is to percolation ponds that infiltrate to shallow ground water associated with the Stillwater River. Depth to ground water varies from 10 to 80 feet below ground surface in the vicinity of the Facility with most monitoring wells having static water levels between 30-50 feet. The maximum daily flow for Outfall 002 reported in Application Form 2C is 720 gallons per minute (gpm), and the long-term average flow is 278 gpm. Discharge Monitoring Report (DMR) data from the period of record (POR) of January 2009 to December 2014 shows a maximum flow rate at Outfall 002 of 720 gpm and an average of 220 gpm.

Outfall 003 also discharges to shallow ground water via percolation ponds. Depth to ground water is from 10 to 80 feet below ground surface, with most monitoring wells having static water levels between 30-50 feet. The maximum daily flow for Outfall 003 reported in Application Form 2C is 917 gpm and the long term average flow is 339 gpm. DMR data from the POR shows a maximum flow rate of 666 gpm and an average of 136 gpm.

1.2.4 Permit Fee Determinations

The Montana Water Quality Act requires that permit fees be assessed that are sufficient to cover the cost administering the permit program (75-5-516, MCA). Permit fees are based on the type of waste (sewage, process wastewater, storm water, noncontact cooling water, etc.) and receiving water or stream segment. An application and annual fee for multiple outfalls is not required unless the discharges are to different receiving waters or result in multiple or variable effluent limits. The table below identifies, individually or by group, the type of wastewater and receiving water by outfall for which effluent limits will be required.

Summary Outfall Categories for Fee Purposes			
Group	Effluent Description	Receiving Water	Outfalls
A	Mine Drainage	Stillwater River	001
B	Mine Drainage	Ground Water/Stillwater River	002, 003

1.2.5 Effluent Characteristics

Effluent characteristics provided by the Permittee in Application Form 2C are summarized in Appendix 3. No actual discharges have occurred at Outfall 001 during the term of the existing permit. Data listed for Outfall 001 is based on data collected at Outfalls 002 and 003.

The existing permit requires that the Facility conduct acute toxicity testing quarterly when discharging at Outfall 001. Because there have been no discharges at Outfall 001, no toxicity results are reported.

1.2.6 Planned Changes

According to the application no improvements or changes in operation are proposed.

1.2.7 Other Information

Application Form 1 lists the following environmental permits that are applicable to the Facility: UIC MT5000-05134, MT5000-08681, MT5000-10110, Air OP245904, MMRA OP #00118, MPDES Storm Water Multi-Sector General Permit Authorization MTR000511.

Permittee is authorized to discharge storm water under DEQ's general permit number MTR000000 for industrial storm water. Authorization MTR000511 lists 2 outfalls, one that discharges to the Stillwater River and one to Mountain View Creek.

1.3 Compliance Summary

During the POR the Permittee did not report any exceedances of permit effluent limits. The Permittee received one violation letter in November 2009 for failure to report pH at Outfall 003. The Permittee submitted an explanation and corrective action for this violation.

A Compliance Evaluation Inspection was conducted on September 30, 2011. No permit violations were observed during this inspection.

2 EFFLUENT LIMITATIONS

The Montana Water Quality Act requires that DEQ specify in the permit any limitations imposed on the volume, strength, and other significant characteristics of the waste to be discharged. The control of pollutants discharged is established through effluent limitations and other requirements in the permit. There are two principal bases for effluent limitations: technology-based effluent limitations (TBELs) that specify the minimum level of treatment or control for conventional, non-conventional, and toxic pollutants and water quality-based effluent limitations (WQBELs) that attain and maintain applicable numeric and narrative water quality standards. Effluent limitations in Section 2 of the permit represent the standards and limitations that are applicable to discharges from the Facility.

2.1 Technology-based Effluent Limitations (TBELs)

Section 402(a)(1) of the federal Clean Water Act (CWA) and the federal regulations at 40 CFR 125.3(a) require that permits issued under section 402, including those issued by state programs, contain TBELs that implement the technology-based treatment requirements specified in the CWA. These technology-based requirements may be national technology standards for existing sources or new sources established by EPA or, in some cases, standards established by the permit writer on a case-by-case basis.

2.1.1 *Scope and Authority*

EPA has promulgated national TBEL and standards of performance for both existing and new sources at 40 CFR Subchapter N. These effluent limitations and standards are more commonly referred to as “effluent guidelines.” EPA promulgates effluent guidelines under the authority of Sections 301, 304, 306, 307, 308, 402, and 501 of the CWA. The Board of Environmental Review (Board) has adopted effluent limitations and standards, toxic effluent standards and new source performance standards in ARM 17.30.1203, 1206 and 1207, respectively, based on the applicable federal regulation. These regulations require that all discharges require, at minimum the following level of treatment:

- Best practicable treatment control technology (BPT) which represents the average of the best performance by plants within an industrial category or subcategory. BPT standards apply to toxic, conventional, and non-conventional pollutants discharged by an existing discharge or new discharge that is not a new source.
- Best available technology economically achievable (BAT) represents the best existing performance of treatment technologies that are economically achievable within an industrial point source category. BAT standards apply to toxic and non-conventional pollutants discharged by an existing discharge or new discharge that is not a new source.
- Best conventional pollutant control technology (BCT) represents the control of conventional pollutants including BOD, TSS, fecal coliform, pH, and oil and grease in an existing discharge or new discharge that is not a new source. The BCT standard is established after considering the “cost reasonableness” of the relationship between the cost of attaining a reduction in effluent discharge and the benefits that would result, and also the cost effectiveness of additional industrial treatment beyond BPT.
- New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-

art treatment technology for new sources. A source is a new source if it meets the definition of new source in ARM 17.30.1304 and 1340(1) and a new source performance standard is independently applicable to it. If there is no such independently applicable standard, the source is a new discharger [ARM 17.30.1340(2)]. A source is an existing source if it is not a new source or a new discharger. For purposes of applying effluent guidelines, the existing sources standards (BPT, BCT, and BAT) apply to existing sources and new dischargers. NSPS apply to new sources.

Pursuant to section 402(a)(2) of the federal CWA, where EPA has not established effluent guidelines that are applicable to a particular class or category of industrial discharger or to a specific discharge, the permit writer establishes applicable technology-based treatment requirements on a case-by-case basis using best professional judgment (BPJ).

Finally, ARM 17.30.1345(1) requires that permit limitations, standards and prohibitions must be established for each outfall or discharge point of the permitted facility, except that best management practices may be imposed under 40 CFR 122.44(k) to control or abate pollution, including: 1) as authorized under section 304(e) of the federal CWA for the control of toxic pollutants from ancillary industrial activities; 2) as authorized under section 402(p) of the federal CWA for the control of (municipal) storm water; 3) when numeric effluent limitation are infeasible; or 4) when the practices are reasonably necessary to achieve effluent limitations or standards or to carry out the purposes and intent of the CWA.

2.1.2 Additional Requirements

Any permit limitations, standards, or other prohibitions which are based on units of production (or other measure of operation) be based on a reasonable measure of actual production of the Facility and not on the designed production capacity. The permit may include a condition establishing alternative permit limitations, standards, or prohibitions based upon anticipated increased or decreased production levels, however, these alternate limits may not exceed maximum production capacity. In calculating alternative permit limitations, the permit must satisfy the requirement of ARM 17.30.1345(4).

All permit effluent limitations, standards or prohibitions for a metal must be expressed as total recoverable metal as defined in 40 CFR 136 unless: 1) the applicable effluent standard or limitation has been expressed in another form; 2) in establishing permit limits on a case-by-case basis under 40 CFR 125.3 (ARM 17.30.1203); or 3) the approved method for the metal only measures the dissolved form (e.g. hexavalent chromium). ARM 17.30.1345(5).

For continuous discharges, all permit effluent limitations, standards, and prohibitions must, unless impracticable, be stated as maximum daily and average monthly discharge limitations for all dischargers other than publicly-owned treatment works (POTWs). ARM 17.30.1345(6).

Dischargers that are not continuous must be particularly described and limited, considering, as appropriate, frequency, total mass, maximum rate of discharge of pollutants during the discharge, and prohibition or limitations of specified pollutants by mass, concentration, or other appropriate measure. ARM 17.30.1345(7).

All pollutants limited in permits must have limitations, standards, or prohibitions expressed in terms of mass except for: pH, temperature, radiation, or other pollutants that cannot be appropriately expressed by mass; when applicable standards and limitations are expressed in terms of other units of

measurement; or if in establishing limitations on a case-by-case basis, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation. ARM 17.30.1345(8).

In addition to technology-based control on wastewater dischargers, technology-based controls must be established in the permit for all solids, sludges, filter backwash and other pollutants removed in the courses of treatment or control of wastewaters in the in the same manner as specified for other pollutants (BPT, BCT, BAT or where applicable NSPS). ARM 17.30.1203.

2.1.3 Applicable Federal Effluent Limit Guidelines

EPA has promulgated effluent guidelines in 40 CFR Part 440, Subpart K for facilities in the Ore Mining and Dressing Point Source Category, Platinum Ores Subcategory. These effluent guidelines are found at 40 CFR §§ 440.110 – 440.115 and Subpart L found at 40 CFR §§ 440.130 – 440.132. The guidelines address mines that produce platinum ores and mills that process platinum ores. The Facility uses the froth flotation process to concentrate metals from platinum ores. ELGs for discharges from froth flotation mills, at 40 CFR 440.113(b) are not applicable to the Facility because there is no discharge from the mill.

The general definitions given in 40 CFR 440.132 are incorporated by reference into this fact sheet and will be included in the permit.

Outfalls 001, 002, and 003

The new source date for the effluent guidelines for the Ore Mining and Dressing Point Source Category is December 3, 1982. However, the NSPS requirements at 40 CFR 440.114 are reserved. Therefore, BPT, BCT, and BAT limitations are the applicable effluent guidelines limitations for discharges from the Facility. No BPT or BCT requirements have been promulgated in the applicable effluent guidelines.

The applicable BAT limitations from the effluent guidelines at 40 CFR 440.113(a) are summarized below.

The concentration of pollutants discharged in mine drainage from mines that produce platinum bearing ores from open-pit or underground operations other than placer deposits shall not exceed:

Mine Drainage—40 CFR 440.113(a)			
Effluent Characteristic	Units	Effluent Limitations	
		Maximum for any 1 day	Average of daily values for 30 consecutive days
Copper	mg/L	0.30	0.15
Zinc	mg/L	1.5	0.75
Lead	mg/L	0.6	0.3
Mercury	mg/L	0.002	0.001
Cadmium	mg/L	0.10	0.05

Mine drainage means any water drained, pumped, or siphoned from a mine. 40 CFR 440.132(h)

2.1.4 Case-by-Case Requirement (BCT) –Outfalls 001, 002, and 003

In addition to the pollutants identified above as technology-based limitations, the proposed permit also retains, from the previous permit, limitations for total suspended solids, which have been established on a case-by-case basis as BCT limitations based on Best Professional Judgment (BPJ). The permit also establishes an effluent limitation for pH which is also a conventional pollutant. The limitations are equivalent to limits for TSS and pH required by the effluent guidelines for other mining subcategories in 40 CFR Part 440. Because the Facility employs underground mining, mine drainage accumulates solids as it passes through the underground workings. Based on the treatment system (clarification), the Facility is currently capable of complying with these limits for pH and TSS. The limitations are summarized below.

BCT Case-by-Case Requirements			
Effluent characteristic	Units	Effluent limitations	
		Maximum for any 1 day	Average of daily values for 30 consecutive days
TSS	mg/L	30	20
pH	SU	6.0 to 9.0	

No TBEL for biochemical oxygen demand (BOD), oil and grease or fecal coliform bacteria are included in this permit

2.1.5 Alternative Effluent Limitations - General Provisions

In addition to the BAT and BCT limits applicable to Outfall 001, 002, and 003, the general provisions of 40 CFR 440.131(a) regarding comingled waste stream are applicable but are not applied to this Facility because the application states that the only source contributing to Outfall 001 and 002 is adit inflow (mine drainage). Likewise, the storm water exemptions of 40 CFR 440.131(b) are applicable to

the Facility but are not applied to any outfall regulated by this permit based on information provided in the application.

2.1.6 Production Data for Application of Effluent Guidelines

The effluent guidelines applicable to Outfall 001 and 002 are not expressed in terms of mass or other production-based limitations. The effluent limitations for this Facility will therefore be expressed in terms of concentration as given in 40 CFR 440, Subpart K.

2.1.7 Variance Request

A discharger that is not a publicly owned treatment works (POTW) may request a variance from otherwise applicable effluent limitation under sections 301(g), 301(n), 302(b)(2), or 316(a) of the federal CWA. A discharge may also apply for certain TBEL to be adjusted based on net intake or net/gross adjustments under ARM 17.30.1354. These requests must be submitted by the end of the public comment period.

The Permittee has not requested a variance for any of the applicable provision and DEQ has determined that the discharge does not qualify for a variance.

2.1.8 Final TBELs

The table below summarizes the calculated TBELs for the Permittee at Outfall 001, 002, and 003.

Outfall 001, 002, and 003

The concentration of pollutants discharged from the Facility shall not exceed:

Parameter	Units	Average Monthly Limitation	Maximum Daily Limitation
Copper, Total Recoverable	mg/L	0.15	0.30
Zinc, Total Recoverable	mg/L	0.75	1.5
Lead, Total Recoverable	mg/L	0.3	0.6
Mercury, Total Recoverable	mg/L	0.001	0.002
Cadmium, Total Recoverable	mg/L	0.05	0.10
TSS	mg/L	20	30
pH	SU	6.0 (minimum) to 9.0 (maximum)	

2.2 Water Quality-based Effluent Limitations (WQBELs)

Section 301(b) of the CWA and 40 CFR 122.44(d), incorporated into ARM 17.30.1344(2)(b) by reference, require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. The degree of waste treatment required to restore and maintain the quality of state water shall be based on the surface water quality standards and: 1) the state's policy of nondegradation of existing water quality in 75-5-303, MCA; 2) present and anticipated (designated) uses of the receiving water; 3) the quality and nature of flow of the receiving water; 4) the quantity and quality of sewage, industrial or other wastes to be treated; and, 5) the presence or absence of other sources of pollution in the watershed.

2.2.1 Scope and Authority

The Montana Water Quality Act at 75-5-401(2), MCA states that a permit may only be issued if DEQ finds that the issuance or continuance of the permit will not result in pollution of any state waters. Montana water quality standards require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. MPDES permits shall include limits on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards.

Title 75, Part 3 of the Montana Water Quality Act, requires the Board of Environmental Review (Board) to establish the classification of all state waters in accordance with their present and future most beneficial uses; to formulate and adopt standards of water quality, giving consideration to the economics of waste treatment and prevention; adopt rules implementing the state's nondegradation policy; and adopt rules governing mixing zones. The Montana Surface Water Quality Standards and Procedures are found in ARM 17.30.601-670, which also includes, by reference, Circular DEQ-7—Montana Numeric Water Quality Standards and Circular DEQ-12A – Montana Base Numeric Nutrient Standards. Montana's regulations on Nondegradation of Water Quality are in ARM 17.30.701-718 and regulations on Mixing Zones in Surface and Ground Water are in ARM 17.30.501-518.

ARM 17.30.603 states that the standards in this subchapter are adopted to establish maximum allowable change in surface water quality and to establish a basis for limiting the discharge of pollutants to surface waters. ARM 17.30.620 states that the specific water quality standards along with the general provision of ARM 17.30.635 through 637, 17.30.645, and 17.30.646 protect the beneficial uses set forth in the water-use classifications.

2.2.2 Applicable Water Quality Standards

The water quality standards include both numeric and narrative standards that protect the beneficial uses set forth in the water use classifications. The specific standards are given in ARM 17.30.621 through 629 and incorporate by reference DEQ Circular DEQ-7 which contains numeric water quality standards for protection of aquatic life and human health, and Circular DEQ-12A.

ARM 17.30.637(1) requires that state waters must be free from substances which will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or

make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and (e) create conditions which produce undesirable aquatic life.

Effluent limitations based on the narrative prohibition of substances that will cause toxicity in state surface water are developed with whole effluent toxicity (WET) tests. These methods may also be used to develop a no observed effects levels for pollutants regulated by narrative standards. WET requirements are discussed in Section 2.2.8 and 2.2.10.

For new sources discharging to high quality waters, effluent limitations for numeric and narrative standards are modified by the criteria in ARM 17.30.715 which are based on the protection of existing water quality. Appendix A provides a summary of water quality standards and any applicable nondegradation criteria for the affected receiving waters.

Water Use Classification and Standards

Outfall 001 discharges directly to the Stillwater River which is located within the Stillwater watershed. This watershed is located in USGS Hydrological Unit Code (HUC) 10070005 and is identified as Montana stream segment MT43C001_020. The designated water-use classification for the river is B-1 and is summarized below.

Outfall 002 and 003 discharge mine wastewater into percolation ponds that infiltrate to ground water below the mine site, adjacent to the Stillwater River, Nye Creek, and the Stillwater Valley Ranch Ponds. Ground water in the vicinity of the percolation pond is up to 80 feet below the surface, with most monitoring wells having static water levels between 30-50 feet (previous permit Statement of Basis). The direction of ground water flow in the Stillwater River valley is towards the north/northeast following the trend of the valley. The degree of hydrological connection has not been established nor has the point of discharge to surface water. Both Nye Creek and the Stillwater Valley Ranch Ponds are downgradient of Outfall 002. Lacking definitive information regarding hydrological connection, it appears that the ground water mixing zone for Outfall 002 intersects surface water in either Nye Creek or the Stillwater Valley Ranch ponds, or both.

Discharges to Outfall 002 and 003 are assessed for effects to both ground water and surface water in this permit renewal.

The water-use classification for ground water at the site is Class I based on Montana ground water standards and is also summarized below. ARM 17.30.1006.

Water Use Classification and Beneficial Uses—Stillwater River and Ground Water	
Classification	Beneficial Uses
B-1	Drinking, culinary and food processing purposes after conventional treatment; Bathing, swimming, and recreation; Growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and Agricultural and industrial water supply
I	The quality of Class I ground water must be maintained so that these waters are suitable for the following uses with little or no treatment: public and private water supplies; culinary and food processing; irrigation; livestock and wildlife; and commercial and industrial purposes.

The water quality standards and nondegradation criteria that apply to the receiving waters for each regulated outfall, based on the water use classification, are presented in Appendix 1.

2.2.3 Design Conditions

Montana water quality standards state that no wastes may be discharged, either alone or in combination with other wastes, or activities, that will violate or can reasonably be expected to violate any of the standards. In order to establish discharge limitations in permits it is necessary to determine certain characteristics of the receiving water that are critical for the protection of designated uses and existing water quality (new sources). Both the quantity and quality of the receiving water vary on a daily, seasonal and annual basis. Montana water quality standards establish certain critical conditions for surface water that establish the basis for limiting the discharge of pollutants in surface.

CRITICAL STREAM FLOW (Q_s)

Critical stream flow is based on the specific standards of ARM 17.30.620-629 which require that discharge permits not cause receiving water concentrations to exceed applicable standards when stream flows equal or exceed the design flows specified in ARM 17.30.635(2). This rule states that the receiving water design flow for point source discharges must be based on the minimum consecutive seven day average flow which may be expected to occur on the average once in 10 years (7Q10). If there are insufficient data to establish a 7Q10, DEQ must establish an acceptable stream flow. Effluent limitations for controlling nitrogen and phosphorus must be based on the seasonal 14Q5, which is the lowest average 14 consecutive day low flow, occurring from July through October, with an average recurrence frequency of once in five years.

The Statement of Basis (SOB) for the 2008 permit used the USGS calculated 7Q10 from station 06202510 on the Stillwater River near Nye (McCarthy 2004). Flow data were collected at this station between 1979 and 1991 after which the station was discontinued. Lacking sufficient flow data to calculate a revised 7Q10 for the Stillwater River upstream of the Facility, this 7Q10 is continued in this permit renewal. Similarly, the seasonal 14Q5 calculated at the same USGS station will be used as the critical stream flow for determining RP and effluent limits for nitrogen and phosphorus.

Critical stream flow used for water quality assessment of discharges from the Facility as well as the sources of information for determining the critical flow is summarized below.

Outfall(s)	7Q10 (CFS)	14Q5 (CFS)	Information Source
001	31	81	Existing Permit / McCarthy 2004
002	31	81	Existing Permit / McCarthy 2004
003	31	81	Existing Permit / McCarthy 2004

CRITICAL BACKGROUND RECEIVING WATER POLLUTANT CONCENTRATION (C_s)

The critical pollutant concentration is the average or mean concentration expected in the receiving water during the flow period corresponding to the critical stream flow (7Q10 or 14Q5) (See *Handbook: Stream Sampling for Waste Load Allocation Applications*, EPA/625/6-86/013, September

1986; *Technical Guidance Manual for Performing Waste Load Allocations, Book VII: Permit Averaging Period*, EPA, September 1984). Since the critical stream flow is an infrequent event, this value must be estimated based on existing water quality data that are collected at non-critical conditions. The critical receiving water pollutant concentration is not given by a single value but is estimated to be in a range defined by the first quartile (25th percentile) and third quartile (75th) percentile of the measured background data.

The background concentration is not equivalent to the natural condition of the receiving water. Background concentration is used to determine assimilative capacity and incorporates point and nonpoint activities in the watershed at the present time. Background concentrations, sources of information and methodology are presented in Appendix 2.

The magnitude of some numeric standards is dependent on characteristics of the receiving water, such as hardness, pH, and temperature. Hardness used to calculate metal standards is estimated to be 25 mg/L based on the 25th percentile of the receiving water data. For purposes of determining the value of water quality standards for ammonia, the 75th percentile of pH and temperature are used. These values are 7.5 s.u. for pH and 7.5 °C for temperature.

Basis for Certain Numeric Water Quality Standards			
Dependent Parameter	Measured Parameter	Statistic	Value
Metals (Cadmium, Copper, Chromium(III), Lead, Nickel, Silver, and Zinc)	Hardness (as CaCO ₃)	25 th percentile	25
Ammonia -- Acute	pH	75 th percentile	7.5
Ammonia -- Chronic	pH	75 th percentile	7.5
	Temperature	75 th percentile	7.5

The numeric water quality standards applicable to Stillwater River are shown in Appendix 1 to this fact sheet.

2.2.4 Impaired Waters

The MWQA at 75-5-702, MCA, requires that DEQ monitor state waters and to assess the quality of those waters to identify surface water bodies or segments of water bodies whose designated uses are threatened or impaired. Section 75-5-703, MCA requires that DEQ complete a TMDL for those water bodies that are identified as threatened or impaired. These requirements satisfy sections 303(d) and 305(b) of the federal Clean Water Act.

Upon approval of the TMDL, the wasteload allocation developed for a point source must be incorporated into the Facility's discharge permit. Pending completion of a TMDL on a listed waterbody, a point source discharge may continue or commence provided that: 1) the discharge is in conformance with the state's nondegradation policy and rules; 2) the discharge will not cause a decline in water quality for any parameter by which the water body is impaired; and, 3) minimum treatment requirements are met. A WLA is defined as the portion of the receiving water's loading capacity that is allocated to one of its existing or future point sources.

2014 303(d) List

The Stillwater River, assessment unit MT43C001_020 is listed as impaired on the 2014 303(d) list as not supporting the aquatic life and drinking water uses. Listed causes of impairment are cadmium, chromium, copper, cyanide, mercury, nickel and nitrate/nitrite. Sources of impairment are abandoned mine lands (inactive) and “unknown” for the metals, and permitted hardrock mining discharges (SMC), watershed runoff following forest fire, and natural sources for nitrate/nitrite.

Approved TMDL

The Water Quality Restoration Plan for the Cook City TMDL Planning Area was approved by EPA in 2002. This TMDL included the segment of the Stillwater River upstream of the Facility, and did not include a wasteload allocation for the Facility. The TMDL for the Stillwater Columbus planning area is pending, therefore, there are no TMDL WLAs applicable to the Facility at this time.

Ground Water Assessment

Outfalls 002 and 003 discharge directly into unconsolidated material (alluvium) and associated ground water. Ground water standards established in ARM 17.30.1006 apply to all ground water outside of a department approved mixing zone. These standards establish the maximum allowable change in ground water quality and provide a basis for limiting discharges to ground water. ARM 17.30.1005. Ground water is also subject to the nondegradation requirements in ARM 17.30.701-717. The water use classification is based on the natural specific conductance (SC) of the water.

The 2008 discharge permit granted a standard mixing zone for Outfall 002 extending in a northerly direction 500 feet downgradient and approximately 507 feet wide at its terminal end. The mixing zone was granted for total nitrogen only. The 2008 permit required monitoring downgradient of the mixing zone in monitoring well MW-17. While MW-17 is the monitoring point for ground water associated with Outfall 002, this well is located 500 to 700 feet beyond the end of the Outfall 002 ground water mixing zone and not at the “downgradient (northern) edge of the mixing zone”, as stated in the 2008 permit’s statement of basis. Therefore, the usefulness of this data is limited. The data from this well is summarized below.

Ground Water Monitoring Well MW-17						
Parameter	Units	Ground Water Standard	Surface Water Standard (lowest applicable)	Average	Maximum	Number of Samples
Temperature	°C	--		9.6	12.1	18
Specific Conductance	µmho/cm	--		158	189	18
pH	SU	--	6 - 9	7.3	7.8	18
Total Ammonia	mg/L	--	13.3	0.05	0.05	18
Nitrite plus Nitrate	mg/L	10	10	0.43	1.8	18
Total Kjeldahl Nitrogen	mg/L	--	--	0.18	0.5	18
Total Nitrogen	mg/L	--	0.300	0.53	1.9	18
Total Phosphorus	mg/L	--	0.030	0.01	0.02	18
Cadmium, dissolved	µg/L	5	0.097	0.2	1	18
Chromium, dissolved	µg/L	100	100	5.4	8.0	18
Copper, dissolved	µg/L	1,300	2.85	1.1	2.0	18
Iron, dissolved	µg/L	--	1,000	16.7	50	18
Lead, dissolved	µg/L	15	0.545	<3	<3	18
Manganese, dissolved	µg/L	--	50	5.2	9.0	18
Mercury, dissolved	µg/L	2	0.05	<0.01	<0.01	18
Nickel, dissolved	µg/L	100	16.1	<10	<10	18
Silver, dissolved	µg/L	100	0.374	<0.8	<5	18
Zinc, dissolved	µg/L	2,000	37	<10	<10	18

The 2008 discharge permit granted a source specific mixing zone for Outfall 003 extending in a northerly direction 2,000 feet downgradient and approximately 650 feet wide at its terminal end. The mixing zone was granted for total nitrogen only. The mixing zone extends under the waste rock pile. The 2008 permit required monitoring at the downgradient end of the mixing zone in monitoring well MW-14. Because of the influence of the waste rock pile, which is not covered under the MPDES permit, the usefulness of this monitoring well to assess the effects from the Outfall 003 discharge is limited. This data is summarized below.

Ground Water Monitoring Well MW-14						
Parameter	Units	Ground Water Standard	Surface Water Standard (lowest applicable)	Average	Maximum	Number of Samples
Temperature	°C	--		9.8	11.5	18
Specific Conductance	µmho/cm	--		340	481	18
pH	SU	--	6 - 9	7.3	7.6	18
Total Ammonia	mg/L	--	13.3	0.06	0.16	18
Nitrite plus Nitrate	mg/L	10	10	8.5	15	18
Total Kjeldahl Nitrogen	mg/L	--	--	0.2	0.9	18
Total Nitrogen	mg/L	--	0.300	8.6	15.1	18
Total Phosphorus	mg/L	--	0.030	0.02	0.05	18
Cadmium, dissolved	µg/L	5	0.097	0.1	0.1	18
Chromium, dissolved	µg/L	100	100	5	8	18
Copper, dissolved	µg/L	1,300	2.85	<1	<1	18
Iron, dissolved	µg/L	--	1,000	548	4,475	18
Lead, dissolved	µg/L	15	0.545	<3	<3	18
Manganese, dissolved	µg/L	--	50	0.42	3.48	18
Mercury, dissolved	µg/L	2	0.05	<0.01	<0.01	18
Nickel, dissolved	µg/L	100	16.1	<10	<10	18
Silver, dissolved	µg/L	100	0.374	<0.8	<5	18
Zinc	µg/L	2,000	37	<10	<10	18

2.2.5 Pollutants of Concern

WQBEL are assessed for those pollutants of concern (POC) based on the effluent characteristics, federal effluent limit guideline (ELG), and the water quality objectives for the affected receiving water(s). DEQ has identified the POCs listed below for purposes of assessing WQBELs. Included in this list is any pollutant that has an assigned wasteload allocation as part of a TMDL or for which the receiving water body is listed as impaired, exceeds a water quality standard or nondegradation criterion in the effluent or is subject to a federal ELG.

DEQ identified the following pollutants and parameters of concern for discharges from the Facility for purposes of assessing the need for and developing WQBELs. The Stillwater River is identified as the receiving water for Outfall 001 and the ultimate receiving water for Outfalls 002 and 003. Therefore, these POC are applicable to all outfalls.

Pollutants of Concern	
Parameter	Basis for Identifying as a Pollutant of Concern
Outfall 001, 002, 003	
Copper Zinc Lead Mercury Cadmium TSS pH	Applicable TBELs
Total Nitrogen Total Phosphorus Ammonia Temperature Cadmium Chromium Copper Iron Lead Nickel Zinc Total Suspended Solids Flow	Existing WQBELs – Outfall 001
Cadmium Chromium Copper Cyanide Mercury Nickel Nitrite+Nitrate	303(d) List

2.2.6 Nondegradation Analysis

The MWQA includes a nondegradation policy at 75-5-303, MCA which protects existing water quality from undue degradation. This policy applies to any new or increased activity which results in a change in existing water quality. The MWQA states that it is unlawful to cause degradation of state waters unless authorized by DEQ pursuant to ARM 17.30.706-708. The regulations at ARM 17.30.701-718 implement the state's nondegradation policy. The level of protection provided to the receiving water(s) is specified in ARM 17.30.705(2) and conforms to three "tiers" of the federal antidegradation policy at 40 CFR 131.12. These three levels of protection are as follows:

Protection of Existing Uses (Tier 1): Existing and anticipated (designated) uses of state waters and the level of water quality necessary to protect those uses must be maintained and protected (ARM 17.30.705(2)(a)). Tier I protection applies to all state waters including waters not designated as high quality. The effluent limitations applied to outfalls subject to this level of protection are derived from and comply with the state's numeric and narrative water quality standards and, therefore, ensure the level of water quality necessary to attain and maintain existing and anticipated uses are fully protected. Effluent limitations based on this level of protection need to also consider protection of any downstream or downgradient receiving waters, which may require a higher level of protection. ARM 17.30.706(3)(d).

Protection of High Quality Waters (Tier 2): Unless authorized by DEQ under ARM 17.30.706 – 708 (authorization to degrade) or exempted from review under 75-5-317 MCA, the quality of high-quality waters must be maintained (ARM 17.30.705(2)(b) and 75-5-303(2), MCA). High quality waters, as defined in 75-5-103(10) MCA and ARM 17.30.702(8), includes all state surface waters except those not capable of supporting any one of the designated uses for their classification or that have zero flow or surface expression for more than 270 days during most years. Any water body for which the receiving water pollutant concentration (C_s) is less than the applicable water quality standard (S) is considered high quality. This determination is made on a parameter by parameter basis and may include waters listed on the state's 303(d) list.

Protection of Outstanding Resource Waters (Tier 3): ARM 17.30.705(2)(c) requires that, for outstanding resource waters, no degradation is allowed and no permanent change in the quality of outstanding resources waters resulting from a new or increased point source discharge is allowed.

Though the nondegradation criteria are not numeric water quality standards, a discharge that meets these criteria is in compliance with Montana's nondegradation policy. New discharges (or sources) that are able to meet WQBELs based on application of nonsignificance criteria in 17.30.715 (1) are not required to submit an authorization to degrade state waters under ARM 17.30.706-708.

DETERMINATION – NEW OR INCREASED SOURCES

The original permit for the Facility was issued in 1979. As such the Facility is not a new or increased source subject to review under the non-degradation rules. Based on this, DEQ has made the following determinations with respect to the proposed discharges:

New or Increased Source Determination			
Outfall(s)	Receiving Water	Source Determination	Nondegradation - Level of Protection Required
001	Stillwater River	Existing	Tier 2
002	Alluvial Ground Water/ Stillwater River	Existing	Tier 2
003	Alluvial Ground Water / Stillwater	Existing	Tier 2

2.2.7 *Mixing Zones*

A mixing zone is an area where the effluent mixes with the receiving water and certain numeric water quality standards may be exceeded. ARM 17.30.502. The Board has adopted rules governing the granting of mixing zones in surface and ground water at ARM 17.30.501-518. These rules require that DEQ determine the applicability of any mixing zone in the permitting process. ARM 17.30.515. Mixing zones allowed under a permit issued prior to April 29, 1993, will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses. ARM 17.30.505. Discharges that do not conform to the criteria of ARM 17.30.501-518 are subject to review and modification.

Where a mixing zone is requested by a discharger, DEQ must determine whether the requested mixing zone may or may not be granted for a particular parameter and, if a mixing zone is granted, the type of mixing zone. Unless specifically requested, granted, and identified in the permit and permit fact sheet, a mixing zone is not assumed for any parameter. The effluent must comply with all applicable effluent limitations and standards, and other treatment requirements in ARM 17.30.1203, 1206 and 1207 prior to the issuance of a mixing zone.

The discharge must also comply with the general prohibitions of ARM 17.30.637(1), which require that state waters, including mixing zones, be free from certain substances.

CHRONIC AND HUMAN HEALTH MIXING ZONE

Mixing zones may be granted for numeric chronic aquatic life, and human health standards, and certain narrative standards.

Depending on the effluent flow and the receiving water flow, DEQ may provide one of the following types of mixing zones in rivers or streams for chronic aquatic life and human health standards: 1) a nearly-instantaneous mixing zone; 2) a standard mixing zone; 3) an alternative mixing zone; or 4) a source-specific mixing zone.

In order for DEQ to grant a mixing zone for a particular pollutant, the permittee must demonstrate that it cannot meet the applicable water quality standards at the point of discharge and demonstrate that it meets the appropriate criteria specified in ARM 17.30.501-518. For purposes of water quality-based permitting calculations it is necessary to determine receiving water flow available for dilution to meet the chronic and acute water quality standards. The chronic dilution flow is based on the dilution allowance which is expressed as percent of the design flow.

The applicable dilution flows are summarized in the Mixing Zone Determination section below.

ACUTE MIXING ZONES

In accordance with ARM 17.30.517(1)(b), acute water quality standards for aquatic life may not be exceeded in any portion of the mixing zone unless DEQ finds that allowing minimal initial dilution will not threaten or impair existing uses. To grant a mixing zone for acute standards, the discharger must demonstrate to DEQ that allowing minimal, initial dilution will not threaten or impair existing beneficial uses. ARM 17.30.507.

Mixing Zone Determination

Outfall 001

The chronic mixing zone authorized in the 2008 permit for discharges at Outfall 001 is retained in the renewal of this permit and will be used to assess reasonable potential and for development of water quality based effluent limits. Granting of this mixing zone is based on the assumption that a properly designed and constructed diffuser will be installed and nearly instantaneous mixing will occur in the receiving water. The relevant effluent limits will be based on 100% of the applicable flow; 7Q10 flow of the Stillwater River which is 31 cfs (20.0 MGD) for chronic, human health and narrative standards, and the 14Q5 for nutrients, which is 81 cfs (52 MGD).

A chronic and human health mixing zone is granted for those parameters where the critical effluent concentration is greater than the chronic or human health standard as follows: the total recoverable metals cadmium, copper, lead, mercury, nickel, silver, and zinc, dissolved aluminum, total nitrogen, total phosphorus, total ammonia, and nitrate plus nitrite. As discussed in the statement of basis for the 2008 permit, the mixing zone shall extend 94 feet (two stream widths) downstream of the proposed effluent diffuser.

A limited acute mixing zone is granted for total ammonia. This mixing zone is granted because mixing is considered nearly instantaneous and DEQ finds that granting this mixing zone will not threaten or impair beneficial uses in the receiving water. The acute mixing zone for ammonia shall be based on 1% of the chronic mixing zone flow, 0.31 cfs (0.2 MGD). No acute mixing zone is authorized for any other parameter at Outfall 001.

Outfall 002

This permit renewal retains the standard ground water mixing zone established in the 2008 permit for discharges at Outfall 002. This mixing zone is for total nitrogen. During previous permit issuances it was determined that human health standards applicable to ground water were not exceeded at the end of the ground water mixing zone.

Due to the hydrologic connection between ground and surface water, WQBELs for Outfall 002 are based on surface water quality standards. Ground water flow available for mixing will be applied to the critical effluent concentrations to determine reasonable potential and develop effluent limits. This is necessary because the ground water mixing zone appears to intersect with surface water. Because surface water quality standards are equivalent to or more restrictive than the ground water standards for the POC, this analysis and any resulting effluent limits will be protective of ground water quality.

Ground water flow is determined as specified in ARM 17.30.517. The standard mixing zone for Outfall 002 is 507 feet wide by 15 feet deep at the downgradient edge (A). Hydraulic conductivity (K) is 400 ft/day, and the gradient (I) is 0.0169. This calculates to 35.7 gpm (0.05 MGD). Lacking additional site specific information, this is the volume of ground water available for dilution prior to the effluent reaching surface water. The permittee has not requested a surface water mixing zone for Outfall 002. With the exception of nitrogen and phosphorus, no surface water mixing zone is granted for discharges at this Outfall. After dilution with ground water, the resulting concentrations will be compared directly to the surface water quality standards.

A standard surface water mixing zone is granted for the sum of the total nitrogen and total phosphorus discharges from Outfalls 002 and 003. ARM 17.30.516(3)(e). Reasonable potential and WQBEL calculations are based on dilution in the ground water mixing zone and with the 14Q5 flow of the Stillwater River; 81 cfs (52 MGD).

Outfall 003

This permit renewal retains the standard ground water mixing zone established in the existing permit for discharges at Outfall 003. This mixing zone is for total nitrogen. During previous permit issuances it was determined that human health standards applicable to ground water were not exceeded at the end of the ground water mixing zone.

Due to the hydrologic connection between ground and surface water, WQBELs for Outfall 003 are based on surface water quality standards. Ground water flow available for mixing will be applied to the critical effluent concentrations to determine reasonable potential and develop effluent limits. This is necessary because the end of the ground water mixing zone is directly upgradient of Outfall 002. Applying the surface water quality standards at the end of this mixing zone will prevent cumulative effects in the Outfall 002 mixing zone and downgradient surface water. Because surface water quality standards are equivalent to or more restrictive than the ground water standards for the POC, this analysis and any resulting effluent limits will be protective of ground water quality.

Ground water flow is determined as specified in ARM 17.30.517. The source specific mixing zone for Outfall 003 is 650 feet wide by 15 feet deep at the downgradient edge (A). Hydraulic conductivity (K) is 400 ft/day, and the gradient (I) is 0.0086. This calculates to 23.3 gpm (0.03 MGD). Lacking additional site specific information, this is the volume of ground water available for dilution prior to the effluent reaching surface water. The permittee has not requested a surface water mixing zone for Outfall 003. With the exception of nitrogen and phosphorus, no surface water mixing zone is granted for discharges at this Outfall. After dilution with ground water, the resulting concentrations will be compared directly to the surface water quality standards.

A standard surface water mixing zone is granted for the sum of the total nitrogen and total phosphorus discharges from Outfalls 002 and 003. ARM 17.30.516(3)(e). Reasonable potential and WQBEL calculations are based on dilution in the ground water mixing zone and with the 14Q5 flow of the Stillwater River; 81 cfs (52 MGD).

WATER QUALITY ASSESSMENT

Along with the general provisions for designation of a mixing zone in ARM 17.30.505 and the specific requirements in ARM 17.30.507, a mixing zone will not be authorized if it would threaten or impair existing beneficial uses. ARM 17.30.506.

DEQ considered the requirements in ARM 17.30.506 for each outfall, as shown in the following table, and determined that the Outfall 001 discharge is via an effluent diffuser, which will minimize effects on the Stillwater River. The surface water mixing zone for Outfall 001 will be maintained. No surface water mixing zone is granted for Outfall 002 or Outfall 003 except for the combined discharge of TN reported as the sum of discharges from all outfalls.

Water Quality Assessment – ARM 17.30.506
<p>Biologically Important Area— <i>(a) Biologically important areas: the presence of fish spawning areas or shallow water nursery areas within the proposed mixing zone or a “shore hugging” effluent plume in an aquatic life segment will support a finding that the mixing zone may be inappropriate during the spawning or nursery periods.</i></p> <p>001: Effluent diffuser will ensure complete and rapid mixing which will preclude shore hugging plume; Yellowstone cutthroat trout are present in the Stillwater River and are list as a species of special concern. 002: Unknown—No surface water mixing zone. 003: Unknown-No surface water mixing zone.</p>
<p>Drinking Water Intake— <i>(b) Drinking water or the existence of a drinking water intake, a zone of influence around a drinking water well or a well used for recreational purpose.</i></p> <p>001: Surface water - Nearest public drinking water intake is the City of Laurel in Yellowstone River approximately 70 miles downstream; no known private intakes. Effluent limits ensure protection and potability of receiving water. 002: Ground Water - No intake structures in designated mixing zone. 003: Ground Water - No intake structures in designated mixing zone.</p>
<p>Recreational Area— <i>(b) Recreational activities or a recreational area within or immediately adjacent to the proposed mixing zone will support a finding that a mixing zone is not appropriate. For purposed of these rules, “recreational” refers to swimming and “recreational area” refers to a public beach or swimming area, including areas adjacent to streams or lakes.</i></p> <p>001: Rapid and complete mixing ensures no impairment of use; Recreation use applies to entire surface water. 002: No surface water mixing zone. 003: No surface water mixing zone.</p>
<p>Attraction to aquatic life— <i>(c) Attraction of aquatic life to the effluent plume: where currently available data support a conclusion that fish or other aquatic life would be attracted the effluent plume, resulting in adverse effects such as acute or chronic toxicity, it may be appropriate to adjust a given mixing zone for substances believed to cause the toxic effects.</i></p> <p>001: Elevated temperature may result in attraction of aquatic life during winter discharges; cold shock potential if discharge is terminated during winter months. 002: No surface water mixing zone. 003: No surface water mixing zone.</p>
<p>Toxic or Persistent Substances— <i>(d) Toxicity/persistence of the substance discharged: where a discharge of a parameter is at a concentration that is both toxic and persistent, it may be appropriate to deny a mixing zone. Toxicity and persistence will be given added weight to deny a mixing zone where the parameter is expected to remain biologically available and where a watershed-based solution has not been implemented. For ground water this factor will also be considered in areas where the parameter may remain in the ground water for a period of years after the discharge ceases.</i></p> <p>002: Toxic and persistent pollutants not well characterized; aggregate toxicity not characterized; no mixing zone granted for toxicity or persistent pollutants. 002: No surface or ground water mixing zone for toxic and persistent parameters. 003: No surface or ground water mixing zone for toxic and persistent parameters.</p>
<p>Passage of aquatic organisms— <i>(e) Where currently available data indicate that a mixing zone would inhibit migration of fish or other aquatic species, no mixing zone may be allowed for the parameters that inhibit migration. In making this determination, the department will consider whether any paramert in the effluent plume will block migration into tributary segments.</i></p> <p>001: Diffuser ensures rapid and complete mixing; minimal blockage expected. 002: No surface water mixing zone. 003: No surface water mixing zone.</p>
<p>Cumulative effects— <i>(f) In some cases, the existence of multiple or overlapping mixing zones may threaten or impair the existing uses of the receiving water, so that any additional mixing zone will be limited or denied for the parameter of concern.</i></p>

001: Effluent diffuser will ensure complete and rapid mixing.
 002: Surface water quality standards applied at end of ground water mixing zone and no surface water mixing zone will prevent cumulative effects with upstream Outfall 001 mixing zone.
 003: Surface water quality standards applied at end of ground water mixing zone will prevent cumulative effects in downgradient Outfall 002 mixing zone. No surface water mixing zone will prevent cumulative effects with upstream Outfall 001 mixing zone.

2.2.8 Reasonable Potential Analysis (RPA)

No wastes may be discharged, either alone or in combination with other wastes, or activities, that will violate or can reasonably be expected to violate any of the standards. All effluents be assessed by the permitting authority to determine the need for WQBELs in the permit. Limitations must be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard. A “reasonable potential analysis” (RPA) is used to determine whether a discharge, alone or in combination with other sources of pollutants already present in the water body could lead to an excursion above a numeric or narrative water quality standard.

For purposes of developing WQBEL for individual pollutants regulated by standards expressed in terms of concentration, DEQ uses a mass-balance equation. The mass-balance equation, given below, is a steady state equation which is used to determine the concentration of a pollutant after accounting for other sources of pollution in the receiving water and any dilution provided by a mixing zone.

$$Q_r C_r = Q_s C_s + Q_d C_d$$

Where:

Q_s	=	critical stream flow at point of discharge, Section 2.2.3
C_s	=	critical background pollutant concentration, Section 2.2.3
Q_d	=	critical effluent flow, Appendix 3
C_d	=	critical effluent pollutant concentration, Appendix 3
Q_r	=	resultant in-stream flow after discharge ($Q_r = Q_s + Q_d$)
C_r	=	resultant in-stream pollutant concentration

Where the projected receiving water concentration (C_r), determined from the available effluent data exceeds a numeric standard or any applicable nondegradation criterion for the parameter of concern, there is reasonable potential and WQBELs must be included in the permit.

In addition to numeric water quality standards, effluent limitation must be included in permits if there is a reasonable potential to exceed narrative standards. This includes the general prohibitions (‘free from’) provision in ARM 17.30.637, including toxicity.

In addition to effluent limitation for individual pollutants, the aggregate toxicity of the whole effluent must be considered and effluent limitations included where there is a reasonable potential to cause or contribute to toxicity. Acute and chronic toxicity are discussed below.

Appendix 4 gives additional detail and specific procedures included in the RPA.

RPA DISCUSSION

Outfall 001

The 2008 MPDES permit included WQBELs for many of the POC identified in Section 2.2.4 of this fact sheet. These effluent limitations were calculated based on maintaining the water quality standards for the Stillwater River. The RPA for this permit renewal was conducted with the most recent ambient data and projected effluent data provided in the permit application. RPA results are shown in Appendix 4, Table 4.A.1.

Total recoverable metals cadmium, copper, lead, mercury, silver, and zinc, dissolved aluminum, and total nitrogen were demonstrated to have reasonable potential. WQBELs are required for these parameters and are discussed in section 2.2.9 below.

Total chromium and total recoverable nickel were not demonstrated to have reasonable potential based on effluent data. However, the 2008 permit includes WQBEL for these parameters and they are listed on the 303(d) list as causing impairment of the Stillwater River. Therefore, these WQBELs are maintained without change in this permit renewal.

Total recoverable iron and total phosphorus did not demonstrate reasonable potential to exceed the standards. Total recoverable manganese was limited in the 2008 permit based on a previous water quality standard. No standard currently exists for manganese. The WQBELs for total recoverable iron and manganese, and total phosphorus are removed in this permit renewal.

Effluent data sufficient to remove the WQBEL for oil and grease was not submitted on the permit application despite being listed as believed absent. This WQBEL is retained without change.

Reasonable potential could not be assessed for total cyanide. Effluent values reported on the permit application were non-detect and cyanide is listed as “believed absent” in the discharge. Cyanide data upstream in the Stillwater River are unavailable. The Stillwater River is listed as impaired for this POC. Monitoring of the effluent (at all outfalls) and the Stillwater River upstream is required in this permit renewal.

Outfall 002

RPA results for outfall 002 are summarized in Table 4.A.2 for the POC. Critical effluent concentrations were determined using TSD methods to first arrive at a projected maximum effluent concentration. This projected maximum effluent concentration was then adjusted to allow for dilution in the ground water mixing zone. The adjusted concentration was then compared directly to the surface water quality standards. Where TBELS for the platinum ore subcategory apply, the TBEL values were used to assess RP. For all other parameters, RP was assessed using the values reported in the permit application. Because of the limited quantity of data for some parameters, principally metals, additional assessment may be necessary as effluent data becomes available.

Reasonable potential to exceed the applicable standard was demonstrated for total recoverable cadmium, copper, lead, mercury, zinc, nickel, iron, and silver, total nitrogen, nitrite plus nitrate, ammonia, and dissolved aluminum. WQBEL are required for these parameters.

Outfall 003

RPA results for outfall 003 are summarized in Table 4.A.3 for the POC. The RPA followed the same method as that described for Outfall 002. Reasonable potential to exceed the applicable standard was demonstrated for total recoverable cadmium, copper, lead, mercury, zinc, nickel, iron, and silver, total nitrogen, nitrite plus nitrate, ammonia, and dissolved aluminum. WQBEL are required for these parameters.

REASONABLE POTENTIAL ANALYSIS (RPA)—WHOLE EFFLUENT TOXICITY

The water quality standards prohibit discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life. Where the results of WET testing are available, this data will be used to determine RP and the need for an effluent limitation.

The existing permit requires acute WET testing for discharges at Outfall 001. Because there have not been any discharges at Outfall 001, the Permittee has not yet conducted acute WET testing and, therefore, no reasonable potential analysis for WET has been conducted.

The existing permit contained a prohibition of acute toxicity as a narrative effluent limitation for discharges at Outfall 001. Monitoring and the WET effluent limitation will be maintained in the permit.

2.2.9 Water Quality Based Effluent Limits (WQBELs)—Individual Pollutants

Water quality based effluent limits must be calculated for both individual pollutants and for the aggregate effect of the discharge as determined by whole effluent toxicity (WET) when there is a reasonable potential to exceed a numeric or narrative standard. The procedure and basis for these calculations are discussed in Appendix 5. Whole effluent toxicity effluent limits are discussed in Section 2.2.10.

Montana water quality standards contain a magnitude, duration and frequency component which varies according to the type of standard. The duration and frequency component of the standard specifies an acceptable exceedance frequency for the standard that will not cause adverse impact to the designated use. The standard may be expressed as paired values, such as acute and chronic, or as a single value. The chronic aquatic life standard is based on a 96-hour average and the acute value is based on a one hour average concentration, not to be exceeded more than once in three years. Human health standards are expressed as no single sample shall exceed (instantaneous) and do not include an averaging period. In order to be incorporated into MPDES permits, these different standards must be expressed as daily discharge limitations.

The procedures, model inputs and derived WLAs are described in Appendix 5 for individual pollutants. These procedures follow EPA's TSD which are based on the requirements of 40 CFR 122.44(d). Final WQBELs are discussed below and summarized in Table 4.1 through 4.3.

Outfall 001

The calculated WQBELs for Outfall 001 are given in the Outfall 001 table below and compared to the limits in the previous permit. WQBEL for oil and grease, chromium, and nickel were not recalculated in this renewal. These limits will be maintained in the current permit with minor modification. The previous permit expressed effluent limitations in terms of 30-day average and instantaneous maximum. To maintain consistency with state and federal regulation governing effluent limitations, all limits will be expressed as average monthly and maximum daily limitations.

For total nitrogen, the calculated average monthly limit (AML) for Outfall 001 was converted to pounds per day by multiplying the concentration-based AML (2.61 mg/L) by the projected average flow rate for Outfall 001 (1.8 MGD) and a conversion factor (8.34). Because the WQBEL calculated for Outfall 001 uses all of the assimilative capacity in the Stillwater River, the load limit is further applied as the SUM limit for all facility outfalls. This approach is consistent with previous permit limits for TN. These previous permit limits were established based on a concentration of 1.0 mg/L in the Stillwater River, and the calculated effluent limit was 100 lb/day as the sum of all discharges from the facility. In this permit renewal, the applicable instream standard is 0.3 mg/L and the calculated AML as a sum of all discharges is 39 lb/day.

DEQ adopted a general nutrient variance in September of 2014. Outfall 001 is not constructed and has not discharged to date. Dependent on when the outfall is constructed, and treatment available at that time, the facility may not be able to comply with the new concentration-based component of the final effluent limit. However, because there has never been a discharge from this outfall, and the facility has demonstrated the ability to comply with the load-based component of the effluent limit, the general variance is not applied in this permit renewal. Should the permittee choose to construct this outfall, the variance may be requested at that time, if necessary. Refer also to the discussion of the total nitrogen limit for Outfall SUM.

Outfall 002

The WQBELs for Outfall 002 are given in the Outfall 002 table below. WQBELs are included for all parameters that were calculated to exceed the lowest surface water quality standard after dilution in the ground water mixing zone.

The previous permit failed to include the required TBELs for this outfall. For those metals subject to federal ELGs the final limits are based on the more stringent of TBELs or WQBELs.

The only restriction placed on Outfall 002 in the 2008 permit was that the sum of total nitrogen discharges from the facility not exceed 100 lb/day. This restriction is retained but modified in this permit renewal to incorporate the new numeric nutrient standard for total nitrogen (see discussion above for Outfall 001).

During the previous permit cycle, the facility sampled for sulfate, which is subject to the narrative water quality standard requiring state waters be free from concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life. Research on the levels where sulfate has an impact on use or impact of the biology/ecology of the Stillwater River are well above effluent concentrations (Sulfate Translation Guidance: WQPBWQSTD-009). No limits or monitoring are included in the draft permit for sulfate at any outfall.

Outfall 003

The WQBELs for Outfall 003 are given in the Outfall 003 table below. WQBELs are included for all parameters that were calculated to exceed the lowest surface water quality standard after dilution in the ground water mixing zone.

The previous permit failed to include the required TBELs for this outfall. For those metals subject to federal ELGs the final limits are based on the more stringent of TBELs or WQBELs.

The only restriction placed on Outfall 002 in the 2008 permit was that the sum of total nitrogen discharges from the facility not exceed 100 lb/day. As described above, this restriction is retained but modified in this permit renewal and calculated based on the new numeric nutrient standard for total nitrogen (see discussion above for Outfall 001).

Outfall 001, 002 and 003 (SUM)

The permit retains loading limitations on total nitrogen as a sum of the discharges at Outfall 001, 002, and 003. The limitations are modified to incorporate the new numeric standard for total nitrogen. As discussed above, the new load limit for total nitrogen is 39 lb/day as the SUM of the loads discharged at all outfalls. To be consistent with the water quality standard, the effluent limit is expressed as an AML only.

DEQ adopted a general nutrient variance in September of 2014. The SUM discharge does not qualify for this variance because the maximum monthly average TN load discharged by the facility over the POR is 27.98 lb/day, the 95th percentile is 20.55 lb/day, and the average is 4.1 lb/day. All of these values comply with the proposed effluent limits, which are based on the water quality standard, therefore no variance is necessary.

Final WQBEL— Outfall 001					
Parameter	Units	Effluent Limitations Previous Permit		Proposed Effluent Limitations	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Aluminum, Total Recoverable	µg/L	--	--	84	168
Cadmium, Total Recoverable	µg/L	<0.08	<0.08	0.23	0.47
Chromium, Total Recoverable	µg/L	174	350	174	350
Copper, Total Recoverable	µg/L	12	25	1.9	3.8
Iron, Total Recoverable	µg/L	6,100	12,230	--	--
Lead, Total Recoverable	µg/L	0.545	13.98	0.85	1.7
Manganese, Total Recoverable	µg/L	350	530	--	--
Mercury, Total Recoverable	µg/L	0.05	0.05	0.49	0.49
Nickel, Total Recoverable	µg/L	48	100	48	100
Silver, Total Recoverable	µg/L	--	--	0.62	1.2
Zinc, Total Recoverable	µg/L	27	55	18.4	37
Phosphorus, Total, as P	lb/d	1.1	1.1	--	--
Nitrogen, Total, as N	mg/L	--	--	2.61	--
	lb/day	100	100	39	--
Oil and Grease	mg/L	10	10	10	10

Final WQBEL— Outfall 002					
Parameter	Units	Effluent Limitations Previous Permit		Proposed Effluent Limitations	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Aluminum, Total Recoverable	µg/L	--	--	94	189
Cadmium, Total Recoverable	µg/L	--	--	0.09	0.18
Copper, Total Recoverable	µg/L	--	--	2.6	5.3
Iron, Total Recoverable	µg/L	--	--	919	1,844
Lead, Total Recoverable	µg/L	--	--	0.5	1.0
Mercury, Total Recoverable	µg/L	--	--	0.06	0.06
Nickel, Total Recoverable	µg/L	--	--	14.8	30.0
Silver, Total Recoverable	µg/L	--	--	1.1	2.3
Zinc, Total Recoverable	µg/L	--	--	34	68
Nitrite plus Nitrate	mg/L	--	--	11.3	11.3
Ammonia, Total, as N	mg/L	--	--	4.0	8.0

Final WQBEL— Outfall 003					
Parameter	Units	Effluent Limitations Previous Permit		Proposed Effluent Limitations	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Aluminum, Total Recoverable	µg/L	--	--	89	179
Cadmium, Total Recoverable	µg/L	--	--	0.08	0.17
Copper, Total Recoverable	µg/L	--	--	2.5	5.0
Iron, Total Recoverable	µg/L	--	--	867	1,739
Lead, Total Recoverable	µg/L	--	--	0.5	1.0
Mercury, Total Recoverable	µg/L	--	--	0.05	0.05
Nickel, Total Recoverable	µg/L	--	--	14.0	28.0
Silver, Total Recoverable	µg/L	--	--	1.1	2.2
Zinc, Total Recoverable	µg/L	--	--	32	64
Nitrite plus Nitrate	mg/L	--	--	10.6	10.6
Ammonia, Total, as N	mg/L	--	--	3.8	7.6

Final WQBEL— Outfalls 001, 002, and 003 (SUM)					
Parameter	Units	Effluent Limitations Previous Permit		Proposed Effluent Limitations	
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Nitrogen, Total, as N	lbs/day	100	100	39	--

2.2.10 Whole Effluent Toxicity Limitations

The permit does not contain effluent limitations for WET. There were no data available to allow an assessment of the need for WET limitations. The permit includes WET monitoring requirements that may be used to assess the need for WET limitations.

2.3 Final Effluent Limitations and Conditions

The final effluent limitations in the permit are based on the more stringent of the calculated TBELs and WQBELs for each parameter, subject to an anti-backsliding analysis. The more stringent limitations will attain both the technology and water quality standards. Stringency of TBEL and WQBEL must be based on a common averaging period and for metals, total recoverable method of analysis.

2.3.1 Stringency Analysis

The permit contains both technology-based and water quality-based numeric effluent limitations for individual pollutants. The technology-based effluent limitations consist of restrictions on total suspended solids and pH based on BPJ. This permit's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, the permit contains effluent limitations more stringent than the minimum, federal technology-based requirements that are necessary to meet water quality standards for cadmium, copper, lead, mercury, and zinc. Limitations for many parameters are newly established in the proposed permit, and are based on the water quality standards for surface water.

2.3.2 Anti-backsliding Analysis

Section 402(o) of the Clean Water Act and section 122.44(l) require, with some exceptions, that effluent limitations or conditions in reissued permits be at least as stringent as those in the existing permit. For Outfall 001, the effluent limitations in the permit are at least as stringent as the effluent limitations in the previous permit, with the exception of cadmium, iron, lead, mercury, manganese, and phosphorus, for the following reasons:

- The effluent limitations for cadmium, iron, lead, and mercury are based on the water quality standards and upstream monitoring data indicates the stream is achieving the water quality standards for these metals. A discharge from Outfall 001 has not occurred to date, therefore the relaxed effluent limits do not result in any change in water quality subject to non-degradation review. Relaxing the limitations is consistent with the anti-backsliding regulations at 40 CFR 122.44(l).
- Manganese and phosphorus limitations are removed because the standards for these pollutants have changed and the discharge no longer exhibits reasonable potential to exceed them. No discharge from Outfall 001 has occurred and non-degradation does not apply. Removing these effluent limitations is consistent with the anti-backsliding regulations.

Final Effluent Limitations—Outfall 001

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
pH	SU	6.0 to 9.0		BCT—BPJ
Total Suspended Solids	mg/L	20	30	BCT—BPJ
Oil and Grease	mg/L	10	10	WQBEL - Existing
Aluminum, Total Recoverable	µg/L	84	168	WQBEL - New
Cadmium, Total Recoverable	µg/L	0.23	0.47	WQBEL-Revised
Chromium, Total Recoverable	µg/L	174	350	WQBEL- Existing
Copper, Total Recoverable	µg/L	1.9	3.8	WQBEL- Revised
Lead, Total Recoverable	µg/L	0.85	1.7	WQBEL-Revised
Mercury, Total Recoverable	µg/L	0.49	0.49	WQBEL-Revised
Nickel, Total Recoverable	µg/L	48	100	WQBEL-Existing
Silver, Total Recoverable	µg/L	0.62	1.2	WQBEL – New
Zinc, Total Recoverable	µg/L	18.4	37	WQBEL-Revised
Nitrogen, Total, as N ¹	mg/L	2.61	--	WQBEL-New
	lb/day	39	--	WQBEL-Revised
Footnotes:				
1. Limit effective July 1 through September 30, annually.				

Final Effluent Limitations—Outfall 002

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
pH	SU	6.0 to 9.0		BCT—BPJ
Total Suspended Solids	mg/L	20	30	BCT—BPJ
Aluminum, Total Recoverable	µg/L	94	189	WQBEL - New
Cadmium, Total Recoverable ¹	µg/L	0.09	0.18	WQBEL - New
Copper, Total Recoverable ¹	µg/L	2.6	5.3	WQBEL - New
Iron, Total Recoverable ¹	µg/L	919	1,844	WQBEL - New
Lead, Total Recoverable ¹	µg/L	0.5	1.0	WQBEL – New
Mercury, Total Recoverable ¹	µg/L	0.06	0.06	WQBEL – New
Nickel, Total Recoverable ¹	µg/L	14.8	30.0	WQBEL - New
Silver, Total Recoverable ¹	µg/L	1.1	2.3	WQBEL - New
Zinc, Total Recoverable ¹	µg/L	34	68	WQBEL – New
Nitrite plus Nitrate ¹	mg/L	11.3	11.3	WQBEL – New
Ammonia, Total, as N ¹	mg/L	4.0	8.0	WQBEL - New
Footnotes:				
1. Effective 58 months after permit effective date				

Final Effluent Limitations—Outfall 003

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
pH	SU	6.0 to 9.0		BCT—BPJ
Total Suspended Solids	mg/L	20	30	BCT—BPJ
Aluminum, Total Recoverable	µg/L	89	179	WQBEL - New
Cadmium, Total Recoverable ¹	µg/L	0.08	0.17	WQBEL - New
Copper, Total Recoverable ¹	µg/L	2.5	5.0	WQBEL - New
Iron, Total Recoverable ¹	µg/L	867	1,739	WQBEL - New

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
Lead, Total Recoverable ¹	µg/L	0.5	1.0	WQBEL – New
Mercury, Total Recoverable ¹	µg/L	0.05	0.05	WQBEL – New
Nickel, Total Recoverable ¹	µg/L	14.0	28.0	WQBEL - New
Silver, Total Recoverable ¹	µg/L	1.1	2.2	WQBEL - New
Zinc, Total Recoverable ¹	µg/L	32	64	WQBEL – New
Nitrite plus Nitrate ¹	mg/L	10.6	10.6	WQBEL – New
Ammonia, Total, as N ¹	mg/L	3.8	7.6	WQBEL - New
Footnotes: 1. Effective 58 months after permit effective date				

Final Numeric Effluent Limitations - Sum of Outfalls 001, 002 and 003 (SUM)

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
Nitrogen, Total, as N	lbs/day	39	--	WQBEL - Revised

2.3.3 Additional Effluent Limitations and Conditions

The Permittee is required to comply with the additional effluent limitations and conditions described below. These conditions are retained from the existing permit.

Additional Effluent Limitations and Conditions—Outfall 001

Effective immediately and lasting through the term of this permit, discharges from Outfall 001 are subject to the additional conditions listed below.

- a. There shall be no discharge of floating solids or visible foam in other than trace amounts.
- b. There shall be no discharge that causes visible oil sheen in the receiving stream.

2.3.4 Interim Effluent Limitations

The permit does not include interim effluent limitations.

2.3.5 Other Information

No additional information is applicable.

3 MONITORING AND REPORTING REQUIREMENTS

All permits must specify: 1) requirements concerning the proper use, maintenance, and, when appropriate installation of monitoring equipment or methods (including biological monitoring); 2) required monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity, including continuous monitoring; 3) applicable reporting requirements based upon the impact of the regulated activity and; 4) as applicable, include monitoring and reporting of storm water discharges. ARM 17.30.1351. This section provides the basis for the monitoring and reporting requirements included in the permit.

In addition to the requirements of ARM 17.30.1351, permits must include monitoring requirements sufficient to determine compliance with permit limitations and other conditions of the permit including requirements to monitor: 1) the mass or other measurement specified in the permit, for each pollutant limited in the permit; 2) the total volume of effluent discharged from each outfall; 3) other measurements, as specified in 40 CFR 122.44(i)(iii); and, 4) pollutants according to test procedures approved under 40 CFR 136, unless another method is specified in 40 CFR Subchapters N or O.

Analytical methods must achieve the required reporting value (RRV) specified in the latest version of Department Circular DEQ-7. The RRVs specified in the following monitoring tables are included for convenience and are the RRVs at the time of permit development. RRVs are subject to change during water quality standards triennial review.

Effluents must be measured and sampled prior to dilution with any receiving waters for compliance with the effluent limitations given in the discharge permit. Effluent limitations are based on daily discharge. Daily discharge means the discharge of pollutants measured during a calendar day or any 24 hour period that reasonably represents the calendar day for purposes of sampling. (ARM 17.30.1304). For pollutants with limitation expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitation expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the day.

All permit effluent limitations, standards or prohibitions for metals must be expressed as total recoverable metal as defined in 40 CFR 136 unless: 1) the applicable effluent standard or limitation has been expressed in another form; 2) in establishing permit limits on a case-by-case basis under ARM 17.30.1203; or 3) the approved method for the metal only measures the dissolved form (e.g. hexavalent chromium). ARM 17.30.1345(5).

All pollutants limited in permits must have limitations, standards, or prohibitions expressed in terms of mass except for: pH, temperature, radiation, or other pollutants that cannot be appropriately expressed by mass; when applicable standards and limitations are expressed in terms of other units of measurement; or if in establishing limitations on a case-by-case basis, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (ARM 17.30.1345(8)). Limitations and monitoring requirements expressed in terms of mass may also be limited in other terms of measurements and the permit must require the Permittee to comply with both.

In addition to the specific monitoring requirements described in this section, the permit contains standard monitoring requirements contained in ARM 17.30.1342.

3.1 Monitoring Location

The authorization to discharge is limited to those locations specially identified in the Facility's MPDES permit application and designated in the permit. The Permittee must monitor the effluent to demonstrate compliance with the effluent limitations and other requirements of this permit at the locations specified in the table below. Monitoring locations and water balance line drawing are shown in Attachment A.

Outfall Designation	Monitoring Location Designation	Monitoring Description
001	001A	At the end of the pipe discharging into the Stillwater River, prior to mixing with the receiving water.
RIV	RIVA	Stillwater River - established upstream location SMC-1a
RIV	RIVB	Stillwater River - established downstream location SMC-11
SUM	SUMA	Sum of all discharges from Outfalls 001, 002, and 003
002	SUM2 ¹	Sum of all discharges to Outfall 002 from monitoring locations SMC-9C & F002A, and SMC-16 & F002B.
002	002A	Monitoring location SMC-9C; Flow monitoring location F002A
002	002B	Monitoring location SMC-16; Flow monitoring location F002B
003	SUM3 ¹	Sum of all discharges at Outfall 003 from monitoring locations SMC-9A & F003A, SMC-9B & F003B, SMC-9D & F003C, and SMC-16 & F003D.
003	003A	Monitoring location SMC-9A; flow monitoring location F003A
003	003B	Monitoring location SMC-9B; flow monitoring location F003B
003	003C	Monitoring location SMC-9D; flow monitoring location F003C
003	003D	Monitoring location SMC-16; flow monitoring location F003D
Footnotes:		
1. Effluent Limits for Outfalls 002 and 003 apply to these monitoring locations only.		

3.2 Monitoring Determination

Monitoring requirements for the discharges and monitoring locations described in Section 3.1 are given in the following tables specific to each monitoring location and are incorporated into the discharge permit. Monitoring frequencies for most parameters are similar to the 2008 permit with minor adjustment discussed below.

All mine drainage at the Facility discharged through Outfalls 001, 002, and 003 must be monitored for compliance with the applicable effluent limitation.

Outfall 001

Metals and nutrients discharged to Outfall 001 are monitored on a weekly basis to reflect the sample size used to determine effluent limitations.

All monitoring for nutrients is based on total nitrogen and total phosphorus to be consistent with the effluent limitations for these pollutants.

Outfall 002

Monitoring for metals discharged to Outfall 002 have been included in the permit to comply with the metals limitations developed in this permit. Metals monitoring results must be reported as total recoverable. The monitoring frequency is weekly for the parameters limited by a federal ELG, as well as mercury, and nutrients. Monitoring is monthly for other parameters. Total nitrogen is either calculated as the sum of the organic nitrogen and nitrite plus nitrate or measured via persulfate digestion. Reporting of total inorganic nitrogen (ammonia plus nitrite plus nitrate) is no longer required to reflect the new water quality standard and revised effluent limitations for nitrogen.

Monitoring for TSS has been added to reflect the TBEL for this parameter. Effluent flow must be monitored on a continuous basis and reported as total volume per day to be consistent with state and federal regulations for flow monitoring.

Monitoring at MW-17 is removed from this permit. The location of this well is too far beyond the end of the ground water mixing zone to accurately characterize the discharge's effect on ground water. Effluent limits apply at the point of discharge, are based on dilution in the ground water mixing zone and are protective of both ground and surface water quality, as related to the discharge.

Outfall 003

Monitoring for metals pollutants discharged to Outfall 003 have been included in the permit to comply with the metals limitations developed in this permit. Metals monitoring results must be reported as total recoverable. The monitoring frequency is weekly for the parameters limited by a federal ELG, as well as mercury, and nutrients. Monitoring is monthly for other parameters. Total nitrogen is either calculated as the sum of the organic nitrogen and nitrite plus nitrate or measured via persulfate digestion. Reporting of total inorganic nitrogen (ammonia plus nitrite plus nitrate) is no longer required to reflect the new water quality standard and revised effluent limitations for nitrogen.

Monitoring for TSS has been added to reflect the TBEL for this parameter. Effluent flow must be monitored on a continuous basis and reported as total volume per day to be consistent with state and federal regulations for flow monitoring.

Monitoring at MW-14 is removed from this permit. This well is influenced by the un-lined waste rock pile, which is not covered by this MPDES permit. Effluent limits apply at the point of discharge, are based on dilution in the ground water mixing zone, and are protective of both ground and surface water quality, as related to the discharge.

3.3 Whole Effluent Toxicity (WET) Testing

Quarterly acute WET testing requirements are retained from the existing permit for Outfall 001. Aggregate toxicity of the effluent has not been assessed. No mixing zone for acute or chronic toxicity is authorized by the permit. The permit will include standard conditions requirements for acute testing based on EPA methods 2002.0 (*Ceriodaphia dubia*) and 2000.0 (*Pimephales promelas*). Monitoring is only required if the Permittee actually discharge at Outfall 001. The permit requires the permittee to report the lethal concentration, 50 percent (LC50) for both species based on a definitive test using a 0.5 dilution series.

No acute WET effluent limitation is established in the permit. However, the permit does contain an acute WET permit trigger which requires a resample and testing for any test which exhibits acute toxicity in less than 100 percent effluent. Additional requirements such as toxicity reduction and identification studies are included in the permit. These requirements are not waived if the discharge to Outfall 001 is redirected to another permitted Outfall.

3.4 Reporting Requirements

All monitoring requirements established in this section shall be reported to DEQ on a monthly or quarterly basis. The Permittee must comply with reporting requirements as specified in ARM 17.30.1342 which are included in the permit.

Monitoring Requirements at Monitoring Location 001A					
Parameter and Code	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis/Comment
Effluent Flow Rate (00056)	MGD	Continuous	Recording Device		Permit Compliance
pH (00400)	s.u.	1/Day	Instantaneous	0.1	Permit Compliance
Total Suspended Solids (00530)	mg/L	1/Week	Composite	1	Permit Compliance
Oil and Grease (00556)	mg/L	1/week	Grab	1	Permit Compliance
Aluminum, Total Recoverable (01104)	µg/L	1/Week	Composite	9	Permit Compliance
Cadmium, Total Recoverable (01113)	µg/L	1/Week	Composite	0.03	Permit Compliance
Chromium, Total Recoverable (01118)	µg/L	1/Week	Composite	10	Permit Compliance
Copper, Total Recoverable (01119)	µg/L	1/Week	Composite	1	Permit Compliance
Iron, Total Recoverable (00980)	µg/L	1/Week	Composite	20	Permit Compliance
Lead, Total Recoverable (01114)	µg/L	1/Week	Composite	0.3	Permit Compliance
Mercury, Total Recoverable (71901)	µg/L	1/Week	Composite	0.005	Permit Compliance
Nickel, Total Recoverable (01074)	µg/L	1/Week	Composite	2	Permit Compliance
Silver, Total Recoverable (01079)	µg/L	1/Week	Composite	0.2	Permit Compliance
Zinc, Total Recoverable (01094)	µg/L	1/Week	Composite	8	Permit Compliance
Cyanide, Total (00720)	µg/L	1/Month	Composite	3	Report Only
Phosphorus, Total as P (00665)	mg/L	1/Week	Composite	0.003	Report Only
Ammonia, as N (00610)	mg/L	1/Week	Composite	0.05	Report Only
Kjeldahl Nitrogen, Total (as N) (00625)	mg/L	1/Week	Composite	0.1	Report Only
Nitrate+Nitrite, as N (00630)	mg/L	1/Week	Composite	0.01	Report Only
Total Nitrogen, as N (00600)	mg/L	1/Week	Calculate	0.07	Permit Compliance
Total Nitrogen, as N (00640)	lbs/day	1/Week	Calculate	--	Permit Compliance
Whole Effluent Toxicity LC50, Statre 48 Hr Acute, Ceriodaphnia dubia (TAM3B)	Percent Effluent	1/Quarter	Composite	Per Method 2002.2	Report Only
Whole Effluent Toxicity, LC 50, 96 -Hr Acute – Pimephales promelas (TAN6C)	Percent Effluent	1/Quarter	Composite	Per Method 2002.2	Report Only

Monitoring Requirements at Monitoring Locations SUM2, 002A, 002B, SUM3, 003A, 003B, 003C, and 003D					
Parameter and Code	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis
Flow Rate (00060)	MGD	Continuous	Recording Device		Report only
pH (00400)	s.u.	1/Week	Grab	0.1	Permit Compliance
Total Suspended Solids (51530)	mg/L	1/Week	Grab	1	Permit Compliance
Aluminum, Total Recoverable (01104)	µg/L	1/Week	Composite	9	Permit Compliance
Cadmium, Total Recoverable (01113)	µg/L	1/Week	Grab	0.03	Permit Compliance
Copper, Total Recoverable (01119)	µg/L	1/Week	Grab	1	Permit Compliance
Iron, Total Recoverable (00980)	µg/L	1/Month	Grab	20	Permit Compliance
Lead, Total Recoverable (01114)	µg/L	1/Week	Grab	0.3	Permit Compliance
Mercury, Total Recoverable (71901)	µg/L	1/Month	Grab	0.005	Permit Compliance
Silver, Total Recoverable (01079)	µg/L	1/Month	Grab	0.2	Permit Compliance
Zinc, Total Recoverable (01094)	µg/L	1/Week	Grab	8	Permit Compliance
Cyanide, Total (00720)	µg/L	1/Month	Composite	3	Report Only
Kjeldahl Nitrogen, Total, as N (00625)	mg/L	1/Week	Grab	0.1	Report Only
Nitrate+Nitrite (00630)	mg/L	1/Week	Grab	0.05	Permit Compliance
Total Nitrogen, as N (00640)	mg/L	1/Week	Calculate	0.07	Permit Compliance
Total Nitrogen, as N (00640)	lbs/day	1/Week	Calculate	--	Permit Compliance
Phosphorus, Total as P (00665)	mg/L	1/Week	Composite	0.003	Report Only
Ammonia, Total, as N (00610)	mg/L	1/Month	Grab	0.05	Permit Compliance

Monitoring Requirements at Monitoring Location: SUM					
Parameter and Code	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis
Total Nitrogen, as N (00600)	lbs/day	Weekly	Calculate	--	Permit Compliance

Monitoring Requirements at Monitoring Locations RIVA and RIVB					
Parameter and Code	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis/Comment
pH (00400)	s.u.	1/Quarter	Instantaneous	0.1	Report Only
Hardness (00900)	mg/L	1/Quarter	Grab	1	Report Only
Cadmium, Total Recoverable (01113)	µg/L	1/Quarter	Grab	0.03	Report Only
Chromium, Total Recoverable (01118)	µg/L	1/Quarter	Grab	10	Report Only
Copper, Total Recoverable (01119)	µg/L	1/Quarter	Grab	1	Report Only
Iron, Total Recoverable (00980)	µg/L	1/Quarter	Grab	20	Report Only
Lead, Total Recoverable (01114)	µg/L	1/Quarter	Grab	0.3	Report Only
Mercury, Total Recoverable (71901)	µg/L	1/Quarter	Grab	0.005	Report Only
Nickel, Total Recoverable (01074)	µg/L	1/Quarter	Grab	2	Report Only
Silver, Total Recoverable (01079)	µg/L	1/Quarter	Grab	0.2	Report Only
Zinc, Total Recoverable (01094)	µg/L	1/Quarter	Grab	8	Report Only
Cyanide, Total (00720)	µg/L	1/Quarter	Composite	3	Report Only
Phosphorus, Total as P (00665)	mg/L	1/Quarter	Grab	0.003	Report Only
Ammonia, as N (00610)	mg/L	1/Quarter	Grab	0.05	Report Only
Kjeldahl Nitrogen, Total (as N) (00625)	mg/L	1/Quarter	Grab	0.1	Report Only
Nitrate+Nitrite, as N (00630)	mg/L	1/Quarter	Grab	0.01	Report Only
Total Nitrogen, as N (00600)	mg/L	1/Quarter	Calculate	0.07	Report Only

4 SPECIAL CONDITIONS

Special conditions are included in MPDES permits when necessary to provide for and assure compliance with additional requirements of the Montana Water Quality Act or Federal Clean Water Act and applicable regulations on a case-by-case basis. ARM 17.30.1344. Special conditions include but are not limited to: collection of additional data, studies or supplemental monitoring, preventative measures, best management practices (BMPs), compliance schedules, ground water protection, programmatic conditions such as pretreatment, sewage sludge or sewer overflow, or, toxicity studies. This section provides the rationale for the special conditions included in the permit.

4.1 Toxicity Identification Evaluation /Toxicity Reduction Evaluation

The permit has established monitoring requirements for acute toxicity. The permit also includes a provision to develop and implement a TIE/TRE plan when monitoring indicates effluent toxicity as defined in the permit occurs.

4.2 Best Management Practices

The permit application states that treated mine wastewater may be discharged to land application sites utilizing spray irrigation or snowmaking during winter months. Seasonal irrigation of treated mine wastewater containing nutrients and metals reduces the volume of wastewater discharged to surface or ground water. The land application area(s) associated with the Facility is located off-site and is not regulated under this permit.

4.3 Supplemental Study— NA

4.4 Compliance Schedules

The permit imposes new WQBELs for several pollutants at Outfall 002 and 003. A compliance schedule to allow the permittee to assess the need for and develop any additional treatment that may be necessary is included in the permit. The final WQBELs shall be effective 58 months after the permit effective date.

Because the final WQBELs at Outfall 002 and 003 are based on conservative assumptions regarding ground water to surface water interaction, the permittee may conduct additional ground water/surface water studies to address the continued need for, or to request modifications of, the final WQBELs. This provision shall not apply to the total nitrogen load limit. Options available to the permittee include, but are not limited to, more accurately characterizing the effluent quality for the parameters limited by the WQBELs, conducting new studies to more accurately determine the quantity and location of effluent discharge from ground water to surface water, conducting surface water quality assessments and mixing zone studies relevant to the discharges from Outfall 002 and 003, and requesting permit modification to incorporate the findings of these studies into the final WQBELs for Outfall 002 and/or 003.

The permit requires the permittee to submit an annual report of progress towards compliance with the final WQBELs, or towards the submission of a request to modify the final WQBELs. Should the permittee choose to apply for a modification of the final WQBELs, such a request must be submitted to DEQ no later one year prior to the effective date of the final WQBELs. The permittee is encouraged to coordinate all activities with DEQ, prior to their initiation.

5 STANDARD CONDITIONS

Standard conditions must be included in all MPDES permits and the Permittee must comply with all standard conditions at all times. ARM 17.30.1342. These requirements are expressly incorporated into Part 5 of the permit. In addition to these requirements, ARM 17.30.1343 and 40 CFR 122.42 establishes additional conditions applicable to specific categories of MPDES permits including: notification requirements for municipal and non-municipal dischargers, reporting requirements for municipal separate storm sewer systems, compliance requirements for individual storm water permits, and additional requirement for concentrated animal feeding operations.

The Facility is an existing industrial discharger and therefore the additional requirements of ARM 17.30.1343(1)(a), which are included in Part 5 of the permit. The requirement establishes additional notification requirements for toxic pollutants that exceed a specified level, exceed the level given in the Facility's permit application or are not regulated in the permit.

6 PUBLIC PARTICIPATION

In accordance with ARM 17.30.1372, DEQ issued Public Notice No. MT-15-39 dated 07/31/2015. The public notice states that a tentative decision has been made to issue an MPDES permit for Stillwater Mining Company, and that a draft permit, fact sheet and environmental assessment (EA) have been prepared. Public comments are invited any time prior to the close of the business 08/31/2015. Comments may be directed to:

DEQ Permitting and Compliance Division
Water Protection Bureau
PO Box 200901
Helena, MT 59620

or DEQWPBPublicNotices@mt.gov

All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit. DEQ will respond to all substantive comments and issue a final decision within sixty days of the close of the public comment period or as soon as possible thereafter.

All persons, including applicants, who believe any condition of a draft permit is inappropriate or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under ARM 17.30.1372.

6.1 Notification of Interested Parties

Copies of the public notice were mailed to the Discharger, state and federal agencies and interested persons who have expressed in interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this permit. In addition to mailing the public notice, a copy of the notice and applicable draft permit, fact sheet and EA were posted on DEQ website for 30 days.

Any person interested in being placed on the mailing list for information regarding this MPDES Permit contact DEQ, reference this Facility, and provide a name, address, and phone number.

6.2 Public Hearing Written Comments

During the public comment period provided by the notice, DEQ will accept requests for a public hearing. A request for a public hearing must be in writing and must state the nature of the issue proposed to be raised in the hearing (ARM 17.30.1373).

6.3 Permit Appeal

After the close of the public comment period DEQ will issue a final permit decision. A final permit decision means a final decision to issue, deny, modify, revoke and reissue, or, terminate a permit. A permit decision is effective 30 days after the date of issuance unless a later date is specified in the decision, a stay is granted pursuant to ARM 17.30.1379, or the applicant files an appeal pursuant to 75-5-403, MCA.

The Applicant may file an appeal within 30 days of DEQ's action to the following address:

Secretary, Board of Environmental Review
DEQ of Environmental Quality
1520 East Sixth Avenue
PO Box 200901
Helena, Montana 59620-0901

7 NONSIGNIFICANCE DETERMINATION

The Montana Water Quality Act states that it is unlawful to cause degradation of state waters without an authorization issued pursuant to 75-5-303, MCA [75-5-605(1)(d), MCA]. ARM 17.30.706(2) states that DEQ will determine whether a proposed activity may cause degradation for all activities which are permitted, approved licensed or otherwise authorized by DEQ, such as issuance of a discharge permit. A nondegradation analysis was conducted in Section 2 of this permit fact sheet for the proposed discharges and activities regulated by this permit. Based on this analysis DEQ has made the following determinations.

Outfall 001, 002, and 003

DEQ has set the effluent limits and conditions in the current permit to comply with the surface water quality standards. The discharges from the Facility at the outfalls listed are an existing source and are not subject to additional non-degradation or non-significance review as required by ARM 17.30.705 and are in compliance with the requirements of Montana's Nondegradation rules and Policy (75-5-301(5) and 303, MCA).

Table 1.A Water Quality Standards—Stillwater River

[illegible]

APPENDIX 2—RECEIVING WATER CHARACTERISTICS

Where receiving water quality data is available it may be used in the development of water quality based effluent limitations (WQBEL). In the absence of receiving water quality and quantity, effluent limits are based on meeting the applicable standard, that is, no assimilative capacity is assumed. For new sources subject to nondegradation review, existing water quality, as defined in ARM 17.30.702, is necessary for all pollutants present in the discharge. All receiving water characteristics must meet the acceptable quality control (QC) and quality assurance (QA) criteria established in DEQ's Quality Management Plan (November, 2009). This Appendix describes the process used to determine the receiving water concentration or value for purposes of developing WQBELs.

Receiving water quality should be based on samples collected at design conditions, this is, the critical stream flow (Q_s), as described in Section 2.2. Because Q_s is an infrequent event and data is not typically available, the background concentration (C_s) must be estimated based on water quality data that is collected outside of this flow condition. To account for the uncertainties in estimating background data, DEQ uses the upper and lower quartiles of the sample data. The upper quartile is defined as the 75th percentile of the measured or observed data and the lower quartile is the 25th percentile of the same data set. To account for the variability of the receiving water, a minimum of 10 data points or measurements must be available and representative of the range of hydrologic conditions in the receiving water. Data used in this analysis must be collected upstream of the point of discharge for flowing water bodies or outside of the influent of the discharge for non-flowing water bodies.

For most constituents, the critical background concentration is defined to be the upper quartile of the sample data for purposes of a reasonable potential analysis and determining assimilative capacity in calculating wasteload allocations (WLA) (Appendix 5). In some cases, including application of the nondegradation criteria in ARM 17.30.715(1), changes in existing water quality or the water quality standard is expressed relative to the background concentration in the receiving water. In these situations the WLA is based on the lower bound estimate of the interquartile range (25th percentile value) to maintain the existing water quality of the receiving water. Additional details on developing WLAs and WQBELs based on these estimates are given in Appendix 5.

Receiving water characteristics for the Stillwater River are described in Table 2.A.1 for the POC and other descriptive parameters. These data are derived from 2 sources. First, the Permittee conducts ongoing ambient monitoring at a number of surface and ground water locations as a condition of the 2000 MPDES permit. Data in Tables 2.A and 2.B are summarized for surface water site SMC1 which is generally considered upstream of any discharges authorized in the Facility's MPDES permit. Monitoring at this location is limited to nitrogen (nitrites plus nitrate, ammonia and Kjeldahl), phosphorus (ortho and total), pH, temperature, hardness, and total recoverable metals (cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc). The period of record for this data is for the calendar quarter ending March 31, 2009 through December 31, 2014. The remainder is data reported to STORET at monitoring stations upstream of the mine, 118SMC-1A, 118SMC-2, and Y04STILR02.

Critical Background Concentration (C_s) – Method of Determination

To estimate the value of C_s , the critical background receiving water pollutant concentration as described in Section 2.2 (design Conditions), the following procedure is applied.

1. Reported data must use an approved method of analysis (40 CFR 136) and achieve the required reporting value (RRV) in DEQ Circular DEQ-7, or achieve a level of analysis that is at least 1/10 of the lowest applicable water quality standard.
2. Reject data which has not achieved the applicable level of analysis in Step 1 or other QA/QC objectives.
3. Determine if there is sufficient data to characterize the receiving water. This data must represent the annual range of variation, generally 10 or more data points.
4. Determine the 25th percentile value ($C_{.25}$) of the data set
5. Determine the 75th percentile value ($C_{.75}$) of the data set

Where there is insufficient data for a parameter, generally less than 10 data points, C_s is undetermined and reported as ("U"). In this case, RPA and WLA/WQBEL are based on meeting the applicable water quality standard or nondegradation criteria at the end of pipe (no receiving water dilution).

Where there are 10 or more data points, for pollutants with a numeric water quality standard or non-significance criterion expressed as an *absolute value* (e.g. numeric criterion or standard):

1. If $C_{.75}$ is a quantified value (i.e. not reported as less than detect), the background concentration (C_s) is estimated by $C_{.75}$
2. If $C_{.75}$ is a non-quantified value (NQV), i.e. reported as less than detect, and if the water quality standard < NQV, DEQ will set $C_s = \text{WQS}$ (no assimilative capacity).
3. If $C_{.75}$ is a NQV and if $\text{RRV} < \text{water quality standard}$, DEQ will set $C_s = \text{NQV}$.

For pollutants with a water quality standard or non-significance criterion expressed as a *relative value* (e.g. increase above background) based on background concentration and where ≥ 10 data points are available:

1. If $C_{.25}$ is a quantified value, then $C_s = C_{.25}$
2. If $C_{.25}$ is a NQV, then $C_s = \text{NQV}$.

For parameters with nondegradation criterion expressed as a relative value and a numeric water quality standard expressed as an absolute value, this method may only be applied if the value determined by $C_{.25}$ is less than the applicable water quality standard. For parameters for which the background concentration or value is undetermined (U), the waste load allocation will be based on 1/10 the lowest applicable water quality standard.

Table 2.A.1 Receiving Water Characteristics -- Stillwater River

Parameter	Units	Required Reporting Value (RRV)	Lower Quartile (C₂₅)	Upper Quartile (C₇₅)	Number of Samples	Comment
Conventional and Nonconventional Parameters						
Biochemical Oxygen Demand	mg/L	--	---	---	---	U
Chemical Oxygen Demand	mg/L	--	---	---	---	U
Total Organic Carbon	mg/L	--	---	---	---	U
Total Suspended Solids	mg/L	1	<1	4	48	STORET
Ammonia	mg/L	0.07	<0.05	<0.05	23	SMC1
pH	SU	0.1	7.0	7.5	23	SMC1
Nitrate+ Nitrite	mg/L	0.02	0.07	0.12	23	SMC1
Nitrogen, Total Kjeldahl	mg/L	--	<0.1	0.2	23	SMC1
Total Nitrogen	mg/L	0.07	0.14	0.22	23	SMC1
Oil & Grease	mg/L	1	--	--	--	U
Total Phosphorus	mg/L	0.003	<0.01	<0.01	23	SMC1
Phosphate, ortho (as P)	mg/L	--	<0.005	0.006	23	SMC1
Iron, Total	mg/L	0.02	<0.03	0.10	9	SMC1
Toxic Parameters						
Aluminum, dissolved	µg/L	9	28	103	9	SMC1
Cadmium, Total	µg/L	0.03	<0.08	<0.08	9	SMC1
Chromium, Total	µg/L	10	<1	<1	23	SMC1
Copper, Total	µg/L	2	<1	2	23	SMC1
Cyanide, Total	µg/L	3	---	---	---	U
Lead, Total	µg/L	0.3	<0.5	<0.5	9	SMC1
Mercury, Total	µg/L	0.005	<0.01	<0.01	9	SMC1
Nickel, Total	µg/L	2	<10	<10	23	SMC1
Silver, Total	µg/L	0.2	<0.5	<0.5	23	SMC1
Zinc, Total	µg/L	8	<10	<10	23	SMC1

APPENDIX 3—EFFLUENT CHARACTERISTICS

The Permittee must provide quantitative data on certain pollutants in the effluent (ARM 17.30.1322). This information is used to determine if effluent limitations in addition to TBEL described in Section 2.1 are necessary. Effluent characterization is based on the daily discharge data for the effluent which is summarized as monthly average and daily maximum values (ARM 17.30.1304). For existing facilities, these values and the corresponding samples size as reported in the facility's permit application are summarized in Tables 3.A.1 and 3.A.2. This data must be based on the previous 3-5 years and represent the current operation of the facility. For new facilities, pollutant concentrations must be estimated.

CRITICAL EFFLUENT POLLUTANT CONCENTRATION (C_d)

For purposes for determining reasonable potential and assessing the need for a WQBEL, DEQ calculates a reasonable measure of the critical (maximum) effluent pollutant concentration (C_d) accounting for the variability of the effluent as determined by the coefficient of variation (CV) and sample size. This procedure accounts for the variability of the effluent as required in 40 CFR 122.44(d). Due to the non-normal distribution of most effluents and low sample frequency (small sample size), DEQ estimates C_d based on the 95th percentile of the expected effluent concentration following procedure described in Chapter 3 of EPA's *Technical Support Document for Water Quality Based Toxic Control*, EPA/505/2-90-001, March 1991 (TSD). The critical effluent pollutant concentration is based on the estimated 95th percentile value and is calculated as follows:

$$C_d = C_{d(max)} * RPMF \quad (A.1)$$

Where:

$C_{d(max)}$	=	Maximum Daily value, Tables 3.A.1 to 3.A.2
RPMF	=	Reasonable Potential Multiplying Factor, Table 3-2, TSD

Estimating the CV requires that the standard deviation be calculated using the actual measured daily discharge values. In most cases, individual daily discharge values are not reported on the discharge monitoring reports (DMR). Where daily discharge values are not available, DEQ assumes a CV of 0.6. For parameters for which a CV of 0.6 was assumed, a RPMF of 1.0 was used for sample sizes greater than 60.

Data reported in the permit application is used for effluent characterization. The 2008 MPDES permit required sampling for metals at Outfall 002 and 003. However, these results were reported as dissolved only and are not used in this analysis. ARM 17.30.1322 and 1345 require quantitative data for metals to be analyzed and reported as total metals. Because the permit will require at minimum, TBEL for both outfalls, as given in 40 CFR 440.113 or Section 2.1 of this fact sheet, these values will be used to estimate the critical effluent concentration for pH and total metals.

CRITICAL EFFLUENT FLOW (Q_d)

Effluent flow is a measure of the average daily flow expected to occur over the next 5-year permit cycle or effective life of the regulated Facility or activity. For facilities other than publicly owned treatment works, the critical flow is based on the reported average daily flow or the maximum 30-day (monthly) average flow reported on the permit application. Effluent flow is expressed as gallons per

day (GPD) or million gallons per day (MGD). For this renewal the long term average flow is the critical effluent flow. These flows are shown below for each outfall.

Critical Effluent Flow		
Outfall	Critical Effluent Flow	Information Source/Period of Record
001	1.8 MGD	Permit Application
002	0.40 MGD	Permit Application
003	0.49 MGD	Permit Application

Table 3.A.1 Conventional and Non-Conventional Pollutants - Outfall 001

Parameter	Units	Permit Application				Coefficient of Variation (CV)	Multiplying Factor (RPMF)	Critical Effluent Concentration (C _d)
		Maximum Daily	Maximum 30-day Average	Long-Term Average or Average Daily	Number of Samples (n)			
Biochemical Oxygen Demand	mg/L	30	NR	NR	1	0.6	6.2	186
Chemical Oxygen Demand	mg/L	33	NR	NR	1	0.6	6.2	205
Total Organic Carbon	mg/L	6.8	NR	NR	1	0.6	6.2	42
Total Suspended Solids	mg/L	<10	NR	NR	1	0.6	6.2	<62
Ammonia	mg/L	14.2	8.9	1.8	69	0.6	1	14.2
Temperature, winter	°F	48	57	53	45	--	--	57
Temperature, summer	°F	69	68	65	45	--	--	69
pH, maximum	SU	9.2	NR	NA	20	--	--	9.0
pH, minimum	SU	6.6	NR	NA	20	--	--	6.0
Nitrate+ Nitrite	mg/L	22.4	16	4.7	69	0.6	1	22.4
Nitrogen, Total organic ¹	mg/L	14	14	8.1	69	0.6	1	14
Total Nitrogen ²	mg/L	36.4	30	55.1	--	0.6	1	36.4
Oil & Grease	mg/L	NR	NR	Absent	0	--	--	U
Total Phosphorus	mg/L	0.48	0.236	0.050	69	0.6	1	0.48
Sulfate	mg/L	214	214	137	20	0.6	1.4	300

Footnotes:

1. Applicant reported total Kjeldahl nitrogen as total organic nitrogen.

2. Sum of the reported Nitrate + Nitrite and total organic nitrogen.

Table 3.A.2 Toxic Pollutants—Outfall 001

Parameter	Units	Permit Application				Coefficient of Variation (CV)	Multiplying Factor 95% Confidence Level	Critical Effluent Concentration (C _d)
		Maximum Daily	Maximum 30-day Average	Long-Term Average or Average Daily	Number of Samples (n)			
Aluminum	µg/L	210	NR	NR	1	0.6	6.2	1,302
Antimony, Total Recoverable	µg/L	<0.5	NR	NR	1	0.6	6.2	0.003
Arsenic, Total Recoverable	µg/L	<1	NR	NR	1	0.6	6.2	6.2
Beryllium, Total Recoverable	µg/L	<0.8	NR	NR	1	0.6	6.2	5
Cadmium, Total Recoverable	µg/L	<0.03	NR	NR	1	0.6	6.2	0.19
Chromium, Total Recoverable	µg/L	1	NR	NR	1	0.6	6.2	6.2
Chromium, Hexavalent	µg/L	NR	NR	NR	--	--	--	--
Chromium, Trivalent	µg/L	NR	NR	NR	--	--	--	--
Copper, Total Recoverable	µg/L	<1	NR	NR	1	0.6	6.2	6.2
Lead, Total Recoverable	µg/L	<0.3	NR	NR	1	0.6	6.2	1.86
Mercury, Total Recoverable	µg/L	<0.005	NR	NR	1	0.6	6.2	0.03
Nickel, Total Recoverable	µg/L	3	NR	NR	1	0.6	6.2	18.6
Selenium, Total Recoverable	µg/L	2	NR	NR	1	0.6	6.2	12.4
Silver, Total Recoverable	µg/L	<0.2	NR	NR	1	0.6	6.2	1.24
Thallium, Total Recoverable	µg/L	<0.5	NR	NR	1	0.6	6.2	3.1
Zinc, Total Recoverable	µg/L	<8	NR	NR	1	0.6	6.2	49.6
Cyanide, Total as CN	µg/L	<5	NR	NR	1	0.6	6.2	31
Phenol, Total	µg/L	<10	NR	NR	1	0.6	6.2	62

Table 3.A.3 Conventional and Non-Conventional Pollutants - Outfall 002 and 003

Parameter	Units	Permit Application				Coefficient of Variation (CV)	Multiplying Factor (RPMF)	Critical Effluent Concentration (C _d)
		Maximum Daily	Maximum 30-day Average	Long-Term Average or Average Daily	Number of Samples (n)			
Biochemical Oxygen Demand	mg/L	30	NR	NR	1	0.6	6.2	186
Chemical Oxygen Demand	mg/L	33	NR	NR	1	0.6	6.2	205
Total Organic Carbon	mg/L	68	NR	NR	1	0.6	6.2	42
Total Suspended Solids	mg/L	<10	NR	NR	1	0.6	6.2	<62
Ammonia	mg/L	8.9	8.9	2.1	69	0.6	1	8.9
Flow (Outfall 002)	MGD	1.0	0.61	0.40	20	NA	NA	NA
Flow (Outfall 003)	MGD	1.3	0.88	0.49	20	NA	NA	NA
Temperature, winter	°F	48	57	53	45	--	--	57
Temperature, summer	°F	69	68	65	45	--	--	69
pH, maximum	SU	9.2	NR	NA	20	--	--	9.0
pH, minimum	SU	6.6	NR	NA	20	--	--	6.0
Nitrate+ Nitrite	mg/L	52.8	16	4.2	67	0.6	1	52.8
Nitrogen, Total organic ¹	mg/L	15.3	15.3	2.8	49	0.6	1	15.5
Total Nitrogen ²	mg/L	68.1	31.3	7.0	--	0.6	1	68.1
Oil & Grease	mg/L	NR	NR	Absent	0	--	--	U
Total Phosphorus	mg/L	0.48	0.236	0.050	49	0.6	1	0.48
Sulfate	mg/L	214	214	137	20	0.6	1.4	300

Footnotes:

1. Applicant reported total Kjeldahl nitrogen as total organic nitrogen.

2. Sum of the reported nitrate + nitrite and total organic nitrogen.

Table 3.A.4 Toxic Pollutants—Outfall 002 and 003

Parameter	Units	Permit Application				Coefficient of Variation (CV)	Multiplying Factor 95% Confidence Level	Critical Effluent Concentration (C _d)
		Maximum Daily	Maximum 30-day Average	Long-Term Average or Average Daily	Number of Samples (n)			
Aluminum	µg/L	210	NR	NR	1	0.6	6.2	1,302
Antimony, Total Recoverable	µg/L	<0.5	NR	NR	1	0.6	6.2	0.003
Arsenic, Total Recoverable	µg/L	<1	NR	NR	1	0.6	6.2	6.2
Beryllium, Total Recoverable	µg/L	<0.8	NR	NR	1	0.6	6.2	5
Cadmium, Total Recoverable	µg/L	<0.03	NR	NR	1	0.6	6.2	0.19
Chromium, Total Recoverable	µg/L	1	NR	NR	1	0.6	6.2	6.2
Copper, Total Recoverable	µg/L	<1	NR	NR	1	0.6	6.2	6.2
Lead, Total Recoverable	µg/L	<0.3	NR	NR	1	0.6	6.2	1.86
Mercury, Total Recoverable	µg/L	<0.005	NR	NR	1	0.6	6.2	0.03
Nickel, Total Recoverable	µg/L	3	NR	NR	1	0.6	6.2	18.6
Selenium, Total Recoverable	µg/L	2	NR	NR	1	0.6	6.2	12.4
Silver, Total Recoverable	µg/L	<0.2	NR	NR	1	0.6	6.2	1.24
Thallium, Total Recoverable	µg/L	<0.5	NR	NR	1	0.6	6.2	3.1
Zinc, Total Recoverable	µg/L	<8	NR	NR	1	0.6	6.2	49.6
Cyanide, Total as CN	µg/L	<5	NR	NR	1	0.6	6.2	31
Phenol, Total	µg/L	<10	NR	NR	1	0.6	6.2	62

APPENDIX 4—REASONABLE POTENTIAL ANALYSIS

When determining the need for WQBELs, DEQ uses estimates of critical effluent concentration and flow (Appendix 3) and the design conditions of the receiving water after accounting for any mixing zone. The resulting instream pollutant concentration is compared to the applicable numeric and narrative water quality standard or nondegradation criterion. For purposes of assessing the need for and calculating WQBELs, DEQ uses the mass-balance equation given in Fact Sheet Section 2.2.8. The mass balance equation assumes steady-state conditions of discharge and receiving water, rapid and complete mixing and is based on the design condition of the receiving water. The mass-balance equation is used to determine the concentration of a pollutant after accounting for the dilution provided by a mixing zone. The mass-balance equation can be arranged to solve for the resulting instream pollutant concentration (C_R) in the receiving water after accounting for dilution and other sources of pollution.

$$C_R = (Q_S C_S + Q_D C_D) / (Q_R)$$

where:

Q_S	=	critical stream flow available for dilution
C_S	=	critical background receiving water pollutant concentration
Q_D	=	critical effluent flow
C_D	=	critical effluent pollutant concentration prior to discharge
Q_R	=	resultant in-stream flow after discharge ($Q_r = Q_s + Q_d$).

If no mixing zone has been granted, the Q_s is '0'.

Where the resulting pollutant concentration (C_R) exceeds the applicable water quality standard or nondegradation criterion, there is reasonable potential and a WQBEL is required for that parameter and must be included in the permit.

RPA results are given in Tables 4.A.1, 4.A.2, and 4.A.3 for Outfalls 001, 002, and 003 respectively, and are discussed in Section 2.2.8.

Parameter	Units	Acute Water Quality Standard (S _a)	Chronic/HH Water Quality Standard (S _c)	Critical Effluent Concentration C _d	Critical Background Receiving Water Concentration C _s	Critical Stream Flow Acute (MGD) (Q _{S/A})	Critical Stream Flow Chronic (MGD) (Q _{S/A})	Projected Receiving Water Concentration Acute (C _{R/A})	Projected Receiving Water Concentration Chronic. (C _{R/C})	WQBEL Needed Based on RPA?
Total Ammonia	mg/L	13.3	4.4	14.2	0.05	0.2	20	12.8	1.2	No
Nitrate + Nitrite	mg/L	--	10	22.4	0.12	--	20	--	2.0	No
Total Nitrogen	mg/L	--	0.300	36.4	0.22	--	52	--	1.43	Yes
Total Phosphorus	mg/L	--	0.030	0.48	0.01	--	52	--	0.026	No
Cadmium, TR	µg/L	0.52	0.097	50 ¹	0.08	0	20	50	4.2	Yes
Copper, TR	µg/L	3.79	2.85	150 ¹	2	0	20	150	14.2	Yes
Lead, TR	µg/L	13.98	0.545	300 ¹	0.05	0	20	300	25.2	Yes
Mercury, TR	µg/L	1.7	0.05	1.00 ¹	0.01	0	20	1.0	0.09	Yes
Zinc, TR	µg/L	37	37	1,500 ¹	10	0	20	1,500	133	Yes
Chromium, Total	µg/L	--	100	6.2	1	0	20	--	1.4	No
Iron, TR	µg/L	--	1,000	806	100	--	20	--	158	No
Nickel, TR	µg/L	145	16.1	18.6	10	0	20	18.6	10.7	No
Silver, TR	µg/L	0.374	100	1.2	0.5	0	20	1.2	0.56	Yes
Aluminum	µg/L	750	87	1,302	103	0	20	1,302	202	Yes
Cyanide, Total ²	µg/L	22	5.2	5	U	0	20	U	U	U

1. Technology-based Effluent Limit

2. Cyanide is listed as believed absent on the permit application and instream data is unavailable. RP could not be determined.

Table 4.A.2 Reasonable Potential Analysis: Outfall 002 Discharging to Stillwater River via Ground Water

Parameter	Units	Acute Water Quality Standard (S _a)	Chronic/HH Water Quality Standard (S _c)	Critical Effluent Concentration (C _d)	Critical Effluent Concentration after GW Mixing ¹ C _d	Background Ground Water Concentration	Background Surface Water Concentration	Critical Stream Flow Chronic/Acute MGD	Projected Receiving Water Concentration Acute (C _{R/A})	Projected Receiving Water Concentration Chronic/HH (C _{R/C})	WQBEL Needed Based on RPA?
Total Ammonia	mg/L	13.3	4.4	8.9	7.9	0	NA	0/0	7.9	7.9	Yes
Nitrate + Nitrite	mg/L	--	10	52.8	46.9	0	NA	0/0	46.9	46.9	Yes
Total Nitrogen	mg/L	--	0.275	68.1	60.5	0	0.22	52/0	--	0.737	Yes
Total Phosphorus	mg/L	--	0.025	0.48	0.43	0	0.01	52/0		0.014	No
Cadmium, TR	µg/L	0.52	0.097	100 ²	88.9	0	NA	0/0	88.9	88.9	Yes
Copper, TR	µg/L	3.79	2.85	300 ²	267	0	NA	0/0	267	267	Yes
Lead, TR	µg/L	13.98	0.545	600 ²	533	0	NA	0/0	533	533	Yes
Mercury, TR	µg/L	1.7	0.05	2 ²	1.8	0	NA	0/0	1.8	1.8	Yes
Zinc, TR	µg/L	37	37	1,500 ²	1,333	0	NA	0/0	1,333	1,333	Yes
Chromium, Total	µg/L	--	100	6.2	5.5	0	NA	0/0	5.5	5.5	No
Iron, TR	µg/L	--	1,000	1,922	1,708	0	NA	0/0	1,708	1,708	Yes
Nickel, TR	µg/L	145	16.1	18.6	16.5	0	NA	0/0	16.5	16.5	Yes
Silver, TR	µg/L	0.374	100	1.2	1.1	0	NA	0/0	1.1	1.1	Yes
Aluminum, dissolved	µg/L	750	87	1,302	1,157	0	NA	0/0	1,157	1,157	Yes
Cyanide, Total ³	µg/L	22	5.2	5	4.4	0	U	0/0	U	U	U

Footnotes:

1. Based on dilution with ground water flow of 51,410 gallons per day (0.05 MGD). See text for discussion.

2. Technology-based effluent limit.

3. Cyanide is listed as believed absent on the permit application and no background data is available. RP could not be determined.

Table 4.A.3 Reasonable Potential Analysis: Outfall 003 Discharging to Stillwater River via Ground Water

Parameter	Units	Acute Water Quality Standard (S _a)	Chronic/HH Water Quality Standard (S _c)	Critical Effluent Concentration	Critical Effluent Concentration after GW Mixing ¹ C _d	Background Ground Water Concentration	Background Surface Water Concentration	Critical Stream Flow Chronic/Acute MGD	Projected Receiving Water Concentration Acute (C _{R/A})	Projected Receiving Water Concentration Chronic/HH (C _{R/C})	WQBEL Needed Based on RPA?
Total Ammonia	mg/L	13.3	4.4	8.9	8.4	0	NA	0/0	8.4	8.4	Yes
Nitrate + Nitrite	mg/L	--	10	52.8	49.8	0	NA	0/0	49.8	49.8	Yes
Total Nitrogen	mg/L	--	0.275	68.1	64.2	0	0.22	52/0	--	0.853	Yes
Total Phosphorus	mg/L	--	0.025	0.48	0.45	0	0.01	52/0	--	0.014	No
Cadmium, TR	µg/L	0.52	0.097	100 ²	94	0	NA	0/0	94	94	Yes
Copper, TR	µg/L	3.79	2.85	300 ²	283	0	NA	0/0	283	283	Yes
Lead, TR	µg/L	13.98	0.545	600 ²	565	0	NA	0/0	565	565	Yes
Mercury, TR	µg/L	1.7	0.05	2 ²	1.9	0	NA	0/0	1.9	1.9	Yes
Zinc, TR	µg/L	37	37	1,500 ²	1,413	0	NA	0/0	1,413	1,413	Yes
Chromium, Total	µg/L	--	100	6.2	5.8	0	NA	0/0	5.8	5.8	No
Iron, TR	µg/L	--	1,000	1,922	1,811	0	NA	0/0	1,811	1,811	Yes
Nickel, TR	µg/L	145	16.1	18.6	17.5	0	NA	0/0	17.5	17.5	Yes
Silver, TR	µg/L	0.374	100	1.24	1.17	0	NA	0/0	1.17	1.17	Yes
Aluminum, dissolved	µg/L	750	87	1,302	1,227	0	NA	0/0	1,227	1,227	Yes
Cyanide, Total ³	µg/L	22	5.2	5	4.7	0	U	0/0	U	U	U

Footnotes:

1. Based on dilution with ground water flow of 33,352 gallons per day (0.03 MGD). See text for discussion.

2. Technology-based effluent limit.

3. Cyanide is listed as believed absent on the permit application and no background data is available. RP could not be determined.

APPENDIX 5—Waste Load Allocations (WLA) and Effluent Limitations

For pollutants that demonstrate RP, water quality based effluent limitations (WQBELs) are based on procedures described in EPA's *Technical Support Document for Water Quality Based Toxic Control*, EPA/505/2-90-001, March 1991 (TSD) with minor modifications to accommodate the specific requirements of Montana's water quality standards. WQBEL must accommodate the magnitude, duration and frequency components of the standards, accounting for any mixing zone, and not allow an exceedance of these standards when stream flows equal or exceed the design flows specified in ARM 17.30.635. DEQ uses the mass balance equation discussed in Section 2.2.8 for RPA.

The mass-balance equation may be arranged to calculate an acceptable effluent concentration or WLA that does not exceed the water quality standard as follows

$$WLA = C_d = Q_r C_r - Q_s C_s / Q_d \quad (A.4)$$

where,

WLA	=	waste load allocation (C_d in the mass-balance equation)
C_r	=	applicable water quality standard (acute, chronic, nutrient, HH)
Q_r	=	downstream flow after available mixing ($Q_s + Q_d$)
C_s	=	receiving water pollutant concentration (background)
Q_s	=	upstream flow available for dilution
Q_d	=	discharge flow

The WLA is then translated into an effluent limitation depending on the type of standard. These procedures are described below. All WLAs are expressed in units of concentration, unless the standard is expressed in other units. Values for the applicable standards and background concentrations are given in Appendix 1 and 2, respectively. Mixing zones and dilution flows are given in Section 2.2.7.

The background concentration affects the determination of the WLA for both new and existing sources. For existing sources where the background concentration as measured by the 75th percentile ($C_{.75}$) exceeds the applicable water quality standard (S), the WLA is set at the standard ($WLA = S$) and no mixing zone is granted. For new sources discharging to high quality water, the background concentration may already exceed the nondegradation threshold (S_n). In order to protect existing water quality, no increase above background concentration is allowed without an authorization to degrade. The process for assigning a WLA is summarized in the table below.

Receiving Water Condition	Determination of WLA With Respect to Background Concentration
New Source - High Quality Receiving Water, Nondegradation-based WLA	
$S_N < C_s < S$	No increase above background allowed; Set WLA = C_s ; No dilution
$S_N < S < C_s$	No assimilative capacity; ARM 17.30.1311(7); Set WLA = S No dilution
Existing Source - Nondegradation Does Not Apply	
$S < C_s$	No assimilative capacity; No dilution; Set WLA = S

PROCEDURES FOR TRANSLATING WLA INTO PERMIT LIMITATIONS

Aquatic Life Effluent Limitations: In most cases, there are two aquatic life WLAs, namely a WLA based on the acute aquatic life standard (WLA_a) and a WLA based on the chronic aquatic life standard (WLA_c). For each of these WLAs, there is a corresponding long-term average effluent concentration (LTA) calculated by multiplying the WLA by a factor (WLA multiplier). This multiplier is a statistically-based factor derived from the ratio of the WLA, set at a specific percentile value, to the LTA. The value of the multiplier varies depending on the coefficient of variation (CV) of the data set, the percentile value for the WLA (e.g., 99th percentile), and whether the WLA is based on an acute (1-hour average) or chronic (4-day average) water quality standard. DEQ sets the WLA at the 99th percentile of the lognormal distribution. The equations for the WLA multipliers ($WLA\ multiplier_{acute99}$, $WLA\ multiplier_{chronic99}$) and the corresponding LTAs are shown below:

$$WLA\ multiplier_{acute99} = EXP(0.5\sigma^2 - z\sigma)$$

$$WLA\ multiplier_{chronic99} = EXP(0.5\sigma_4^2 - z\sigma_4)$$

Where

σ = standard deviation

$$\sigma = [ln(CV^2 + 1)]^{0.5}$$

$$\sigma^2 = ln(CV^2 + 1)$$

$$\sigma_4 = [ln(CV^2/4 + 1)]^{0.5}$$

$$\sigma_4^2 = ln(CV^2/4 + 1)$$

$z = 2.326$ for 99th percentile probability basis

$$LTA_a = WLA_a * WLA\ multiplier_{acute99}$$

$$LTA_c = WLA_c * WLA\ multiplier_{chronic99}$$

Because the calculated LTAs do not have different averaging periods, they can be directly compared to select the most protective aquatic life LTA. This WLA is the basis for calculating effluent limitations that protect aquatic life from both acute and chronic effects. The corresponding CV used in the RPA is used for calculating the aquatic life WLAs. Calculated acute and chronic LTAs are given in below.

The two aquatic life LTAs, acute and chronic, represent two performance levels that the Facility would need to maintain. By comparing the two LTAs and selecting the minimum LTA as the basis for the calculated WQBELs, the procedure ensures that the AML and MDL are based on a single performance level that will protect against both acute and chronic effects.

$$LTA_m = \text{Minimum of } LTA_a \text{ and } LTA_c$$

Effluent limitations for protection of aquatic life are calculated by multiplying the most protective aquatic life LTA by multipliers, which are based on the lognormal distribution. Each multiplier is a statistically-based factor reflects the relationship between the LTA and the effluent limitations. The value of the multiplier for each effluent limitation varies depending on:

- the **probability basis** of the effluent limitation (i.e., the percentile value on the lognormal distribution of effluent pollutant concentrations where the limitation will be set, such as 95th percentile or 99th percentile);
- the **CV** of the data set; and
- the **number of samples** (for the AML) that will be averaged in order to measure compliance with the effluent limitation.

The AML and MDL multipliers are based on the following:

- setting the AML at a 95th percentile occurrence probability and the MDL at a 99th percentile occurrence probability; these probability bases are consistent with EPA's recommendations in the TSD and consistent with the probability bases EPA uses to derive technology-based requirements in the effluent guidelines;
- the CV used in the reasonable potential determination or a default CV of 0.6 if a CV cannot be calculated); and
- the actual monthly sampling frequency that will be required in the permit, unless the planned sampling frequency is one time per month or less; if the sampling frequency that will be specified in the permit is one time per month or less, DEQ uses a value for sampling frequency (n) in the formula for calculating the AML that is greater than one. This procedure assumes a sampling frequency of two to four times per month in order to ensure that the AML will not exceed any of the calculated WLAs, as recommended in EPA's TSD (pp. 107-108).

The formulae for calculating the AML and the MDL from the most protective aquatic life LTA are shown below:

$$AML_{\text{aquatic life}} = LTA \times AML_{\text{multiplier95}}$$

$$MDL_{\text{aquatic life}} = LTA \times MDL_{\text{multiplier99}}$$

$$AML_{\text{multiplier95}} = e^{(z\sigma_n - 0.5\sigma_n^2)}$$

Where:

$$\sigma_n = [\ln(CV^2/n + 1)]^{0.5}$$

$$\sigma_n^2 = \ln(CV^2/n + 1)$$

z = 1.645 for 95th percentile probability basis

n = number of samples per month that will be required in the permit

$$\text{MDL}_{\text{multiplier99}} = e^{(z\sigma - 0.5\sigma^2)}$$

Where:

$$\sigma_n = [\ln(\text{CV}^2 + 1)]^{0.5}$$

$$\sigma_n^2 = \ln(\text{CV}^2 + 1)$$

z = 2.326 for 99th percentile probability basis

Some aquatic life water quality standards are expressed as a single numeric value that defines a single acceptable level of effluent quality; consequently there will be only a single corresponding WLA. DEQ uses the recommendations in the TSD and applies the following procedure:

- Consider the single WLA to be WLA_c ;
- Using the CV determined in the reasonable potential analysis, calculate an LTA that will allow the effluent to meet WLA_c using the equations for the chronic WLA above; and
- Derive an AML and MDL based on the LTA and CV using the equations above.

Human Health Effluent Limitations: Montana's numeric human health numeric standards are expressed as values that may not be exceeded in the receiving water. Because of this requirement, it is necessary to set human health effluent limitations that meet a given WLA on a daily basis. DEQ uses the following approach to establish the effluent limitations for protection of human health:

For parameters where the HHS is the limiting standard, the AML is set equal to the WLA_h , as stated in TSD Section 5.4.4. However in accordance with Circular DEQ-7 Footnote 16, receiving water "concentrations may not exceed" any HHS, so the MDL is also set at the WLA_h .

Nondegradation Effluent Limitations: Nondegradation criteria are determined based on the lowest applicable standard for a pollutant, typically the chronic aquatic life standard or the human health standard. The acute aquatic life standard also applies to discharges subject to nondegradation criteria but is not modified. Effluent limitations are calculated from the acute water quality standard and the nondegradation criteria using the procedures for aquatic life standards and human health standards described above by substituting the chronic nondegradation criterion for the chronic aquatic life standard and the human health nondegradation criterion for the human health water quality standard.

Permittees who are unable to comply with a WQBEL based on a nondegradation criterion may submit an authorization to degrade state waters under ARM 17.30.706.

The final WQBELs for a given parameter are determined as follows:

- For **discharges not subject to nondegradation criteria**, DEQ compares the AML and MDL calculated from the aquatic life standards to the AML and MDL calculated from human health standards. The lowest AML and the lowest MDL are the final calculated WQBELs because the lowest of each of these limitations will assure attainment of both the aquatic life and human health standards.

- For **discharges subject to nondegradation criteria** DEQ calculates an aquatic life AML and MDL based on the acute water quality standard and chronic nondegradation standard using the procedures for aquatic life effluent limitations described above. DEQ then compares these values to the AML and MDL calculated from human health nondegradation criterion determined using the procedures for human health effluent limitations. The lowest AML and the lowest MDL are the final calculated QBELs because the lowest of each of these limitations will assure attainment of all water quality standards and nondegradation criteria.

The calculated QBELs for these outfall(s) must be compared to TBELs for the same parameter to determine the final permit effluent limitations that meet the requirements of Section 301 of the federal Clean Water Act (CWA) and protect the designated uses of the receiving water required by Section 302 of the federal CWA. This stringency analysis is discussed in Section 2.3 of the permit fact sheet. After determining the most protective of the calculated limitations, DEQ must also consider the anti-backsliding requirements of Section 402 of the federal CWA in determining the final permit effluent limitations.

Metal Translator: Because effluent limitations for metals must be expressed as total recoverable it is necessary to translate the dissolved aluminum standard to total recoverable effluent limitation. The Department follows the procedure outlined in EPA's Office of Water publication EPA 823-B-96-007 (*The Metals Translator: Guidance for Calculating A Total Recoverable Permit Limit From A Dissolved Criterion*, June 1996). The total recoverable concentration that equates to the dissolved standard is expressed as:

$$WLA_{(TR)} = WLA_{(Diss)} \times (F_D)^{-1}$$

Where: F_D = dissolved fraction.

The value of F_D varies from 0.4 to 1.0 and is typically a site-specific determination. For aluminum, in the absence of site-specific information, the Department assumes a dissolved fraction of 0.85. The WLA based on this translator is given in Table 5.1.A.

The Permittee may conduct a field study to develop a site-specific value in accordance with the EPA guidance document.

FINAL CALCULATED QBEL

QBEL calculations for all three outfalls are summarized in the following three tables.

For Outfall 002 and 003, WLA for all parameters were based on the lowest applicable water quality standard for the Stillwater River after dilution in the groundwater mixing zone. Ground water standards are protected because effluent limitations based on surface water aquatic life and human health are applied at the end of the ground water mixing zone and are at least as stringent as the ground water standards. No surface water mixing zone was granted for any parameter.

Table 5.A.1 WQBELs Outfall 001

Parameter	Units	Acute Wasteload Allocation (WLA _a)	Chronic Wasteload Allocation (WLA _c)	Human Health Wasteload Allocation (WLA _h)	Acute Long Term Average (LTA _a)	Chronic Long Term Average (LTA _c)	Minimum Long Term Average (LTA _m)	Aquatic Life AML	Aquatic Life MDL	Human Health AML	Human Health MDL	Final WQ-based Effluent Limitations		Basis for WQBEL Calculations
												AML	MDL	
Cadmium, TR	µg/L	0.52	0.29	60	0.17	0.15	0.15	0.23	0.47	30	60	0.23	0.47	Aquatic Life Standard
Copper, TR	µg/L	3.79	12.3	15,722	1.22	6.48	1.22	1.89	3.78	7,861	15,722	1.89	3.78	Aquatic Life Standard
Lead, TR	µg/L	13.98	1.05	176	4.49	0.551	0.551	0.854	1.71	88	176	0.854	1.71	Aquatic Life Standard
Mercury, TR	µg/L	1.70	10.91	0.49	0.546	5.75	0.546	0.846	1.70	0.49	0.49	0.49	0.49	Human Health Standard
Zinc, TR	µg/L	37	337	24,111	11.9	178	11.9	18.4	36.9	12,055	24,111	18.4	36.9	Aquatic Life Standard
Silver, TR	µg/L	1.24	--	1,206	0.398	--	0.398	0.617	1.24	603	1,206	0.617	1.24	Aquatic Life Standard
Total Nitrogen	mg/L	--	2.61	--	--	1.68	1.68	2.61	--	--	--	2.61	--	Nutrient Standard
Aluminum, TR	mg/L	885	103	--	284	54.2	54.2	84	169	--	--	84	169	Aquatic Life Standard

Table 5.A.2—WQBELs Outfall 002

Parameter	Units	Wasteload Allocation (WLA)	Long Term Average (LTA)	Final WQ-based Effluent Limitations		Basis for Final Limits
				AML	MDL	
Aluminum, dissolved	µg/L	116	61	94	189	Aquatic Life Standard
Cadmium, TR	µg/L	0.109	0.058	0.089	0.179	Aquatic Life Standard
Copper, TR	µg/L	3.21	1.69	2.62	5.26	Aquatic Life Standard
Iron, TR	µg/L	1,125	593	919	1,844	Aquatic Life Standard
Lead, TR	µg/L	0.613	0.323	0.501	1.01	Aquatic Life Standard
Mercury, TR	µg/L	0.06	--	0.06	0.06	Human Health Standard
Nickel, TR	µg/L	18.1	9.5	14.8	30.0	Aquatic Life Standard
Silver, TR	µg/L	1.40	0.735	1.14	2.29	Aquatic Life Standard
Zinc, TR	µg/L	41.6	21.9	34.0	68.2	Aquatic Life Standard
Nitrate plus Nitrite	mg/L	11.25	--	11.25	11.25	Human Health Standard
Total Ammonia	mg/L	4.91	2.59	4.01	8.04	Aquatic Life Standard

Table 5.A.3—WQBELs Outfall 003

Parameter	Units	Wasteload Allocation (WLA)	Long Term Average (LTA)	Final WQ-based Effluent Limitations		Basis for Final Limits
				AML	MDL	
Aluminum, dissolved	µg/L	109	57.4	89	179	Aquatic Life Standard
Cadmium, TR	µg/L	0.103	0.054	0.084	0.169	Aquatic Life Standard
Copper, TR	µg/L	3.02	1.59	2.47	4.96	Aquatic Life Standard
Iron, TR	µg/L	1,061	559	867	1,739	Aquatic Life Standard
Lead, TR	µg/L	0.578	0.305	0.472	0.948	Aquatic Life Standard
Mercury, TR	µg/L	0.053	0.028	0.05	0.05	Human Health Standard
Nickel, TR	µg/L	17.1	9.0	14.0	28.0	Aquatic Life Standard
Silver, TR	µg/L	1.32	0.693	1.08	2.16	Aquatic Life Standard
Zinc, TR	µg/L	39.3	20.7	32.1	64.4	Aquatic Life Standard
Nitrate plus Nitrite	mg/L	10.6	--	10.6	10.6	Human Health Standard
Total Ammonia	mg/L	4.63	2.44	3.78	7.58	Aquatic Life Standard

Attachment A

